An introduction for to learne to reckon with the Pen, or with the Counters, according to the true rule of Algorisme, in whole numbers or in broken newly ouer seene and corrected. Wherto is annexed certaine notable and goodly rules of falle positions, not before seene in our English tong, by the which al manner of difficil questions maye easely be dissolued and applied.

Anno. 1556.

(..)

¶ To the Reader.

That Arte and feate (deare Reader) whome vtilitye and necessity both do commend: needeth greatly of no other commendatiō. How profitably and necessarye this feate of Algorisme is, to al maner of persōs which haue reconinges or accountes, either to make or els to receiue, nedeth no declaration. Neyther is thys Arte onely necessary to those, but also in maner to a maner of Sciences and Artifices. For what craft is that but it somtyme doth occupy, not onely one part of this feate but al the partes? And for because that dyuers rules in thys booke haue not bene in times past very commodiously expressed and set foorth, & many examples, mo then needed a great sort cohea ped together: therfore paines haue ben taken both in the better and more clearer declaration & expressing of the sayde rules, and also in the resecting and cuttyng of diuers superfluous and voyde thinges, rather hinderance to the dyly-

gent Reader, then furtherance. Furthermore there is added the rules of false positions, the which how conuenient and profitable they be to the ready solucion of all hard & misty questions, when ye haue redde them, then iudge. Now then ye shall vnderstand that in this Arte there are .vii. necessary & apte partes to be knowen, that is Numeration, Addicion, Substractio, Multiplication, Partition, Progressions & Reduction. Of the whiche .vii. hereafter shalbe singularly entreted of euery of the in their chapters. But I admytte you fyrst to begyn at the fyrst part, and then successiuely to the seconde, and so the third &c. learning euery parte by it selfe exactly, as they be set forth in this booke. For if you leape to the seconde part, before you haue perfectly y fyrst, or to the thyrd, before you haue lerne the second: you shall neuer profet per nor profit in thys Arte Vale.

¶ The

¶ The fyrst part is of Numeration.

NUmeration is a maner of expressinge of numbers by certaine figures whiche are calied figures of Algorisme the which be ten, as in this example.

i. ii. iii. iiii. v. vi. vii. viii. ix.

1 2 3 4 5 6 7 8 9 0

Of the whiche nyne be significatiue, the tenth caled a cipher, signifieng nothing of it selfe, but onely set before the other significatiue figures, & augmēteth their signification. In numeration by this craft ye must euermore begynne at the right side of the booke, and so towards the left side, as in this example.

k i h g f e d c b a

3 2 0 4 6 7 5 2 8 9

This figure 9 vnder a, standeth in the first place, 8 vnder b standeth in the seconde place, and so foorth to the ende, so that 3 vnder k, standeth in the last place

By these ten figures al maner of number possible to be excogitat, may clearely and plainly be expressed, which albeit, that of them selfe they signifye but simple and little number, as ye se afore yet according to the diuersity of ỹ place they stand in, diuersly doth their signification amount. Wherefore in Numeration ye must note two thinges, the figure signifycatiue, & the place it standeth in, for the signification of ỹ figure depẽdeth vpõ the number of the place it standeth in. For example, this figure 8 standing alone, or in the first place, signifieth but .viii. but if he stand in the second place as here 8 ○. he signifieth viii times ten, which is called .iiii. score. If he stand in the third place, as here .8 ○ ○. he signifieth .viii. hundreth. &c. Therefore ye must know perfectly the signification of euery place, before ye can perfectly number. Wherfore vnderstande ye, that the first place is a place of vnities, so that any figure standing in that

place, signifieth no more, then when he standeth alone. The seconde place is a place of tens. The third is a place of hūdredes. The fourth place is a place of thousands. The fift place is a place of ten thousands. The vi. place a place of hundreth thousandes. The vii. place, is of thousand thousandes, whiche is called a million. The .viii. place is of ten millions. The .ix. is a place of hūdreth millions. The x. of thousand millions. The xi. of ten thousand millions. The xii. of a hundreth thousand millions. The xiii. of a thousand thousand millios. And so forth infinitely euery place ensuinge signifieth .x. tymes as muche as the place going before. This muste thou know perfitely what euery place geueth and signifieth, for the place geueth denomination, and the figure standing in the same place, expresseth how many of the same denomination is to be vnderstande, as in example ye shall more plainly perceiue.

In this summe 34008726 19 thys figure 2 standeth in the .4. place, nowe by youre rule before, the .4. place is a place of thousands, then this figure 2. standinge in the same place, geueth vs to wit that it is .ii. thousand. Likewise this figure 8 standing in the .vi. place, now by your rule as afore, the vi. place is of hundreth thousandes, then this figure 8 stāding in that place receiueth denomination of the place, & representeth to vs. viii. hundreth thousandes. Likewyse this figure 1 standeth in the second place, & because the second place is a place of tens, therfore this figure 1 standing there, is bound to the signification of the place, and so signifieth one ten. If a figure of 4 stoode there, it woulde signifie 4. tens, that is fourty, and so forthe. then for a farther declaratiō of the forsayd summe, and al other lyke summes: Thys figure 9 standinge in the first place, signifieth but him self which is .ix. This figure 1 standinge in

the

the seconde place, because the seconde place is euer a place of tens, signifieth one ten. The figure 6 standinge in the thyrd place, because the thyrd place is a place of hundrethes, doth signifie vi. hundreth. The figure 2 in the iiii. place signifieth ii. thousande. The figure 7. stãding in the fyft place, and that place being a place of ten thousandes, signifieth vii times ten thousand, whyche is .iiii. score thousand and tenne. The figure 8 in the vi. place, signifieth viii. hundreth thousand. The cipher o that standeth in the .vii. place signifieth nothinge, but onelye maketh vp a place, that the figures significatiue following, maye encrease their signification. Lyke iudgement is of the other cipher standinge in the .viii. place. In the .ix. place standeth the figure of 4, and this place is a place of hundreth millions, therfore this figure 4 there signifieth iiii. C. millions. In the .x. place stãdeth the figure 3, and this place is a place of

thousand

thousand millions, therefore it signifyeth .iii. thousand millions. So ỹ whol summe is three thousād millions .iiii. C. millions viii. C. thousād. three score thousandes. xii. thousand. vi hundred and .xix. Now to exercise your selfe in Numeration, number with your self these summes folowinge, as they be here set foorthe in this table. Which noting it well, shall easely teache you both to knowe the value of the places and also the summe of euery figure.

¶ The description of thys Table folowing.

THis Table (as you may see) hath eyght places, and in eche of them are set al the digets, whose certaine valew is written on the right hand of the Table, and ỹ value vncertaine on the left hande. So that here by you maye learne howe to expresse anye number that you will.

¶ The

¶ The Table.

X. Millions.	Millions.	C. thousand.	X. thousand.	Thousands.	Hundrethes.	Tennes.	Unities.	The dominatours of the places, or value uncertaine.
1	1	1	1	1	1	1	1	One.
2	2	2	2	2	2	2	2	Twoo.
3	3	3	3	3	3	3	3	Three.
4	4	4	4	4	4	4	4	Foure.
5	5	5	5	5	5	5	5	Fyue.
6	6	6	6	6	6	6	6	Syxe.
7	7	7	7	7	7	7	7	Seuen
8	8	8	8	8	8	8	8	Eyght.
9	9	9	9	9	9	9	9	Nyne.
0	0	0	0	0	0	0	0	Cipher.
Eyght.	Seuenth.	Syxth.	Fyft.	Fourth.	Thyrd.	Second.	Fyrst.	The order of the places.

¶ Fure

Of Numeration.

¶ Furthermore thou must note that there be in Algorisme three manner of numbers, Diget number, Article, and Compost.

The diget number is all maner of numbers which are vnder x. as these.

9 8 7 6 5 4 3 2 1.

The article number is all numbers which are of. x. as these.

10 20 30 40 50 60 70 80 90.

The compounde number is all maner of numbers which are compounde or made of the diget and article together as folowyth.

11 12 13 14 15 16 17 18 19.

21 22 23 24 25 26 27 28 29.

31 32 33 34 35 36 37 38 39.

And so forth of all other. Thus is sufficient for the knowledge of Numeration in Algorisme.

¶ The end of Numeration.

The

¶ The second part called Addition.

Addition is a collection of dyuers and sundry summes into one totall Summe, whiche contayneth as muche in hym as all other Summes, beeing before sundry. In addition are .ii. numbers to be considered, ỹ one is, the numbers which must be adioyned together, the other is the numbers which redoūdeth of their additiō together, which otherwise is called the total sum. Then when ye wil adde many sums together, first write them layze ỹ one directly vnder the other, so that the first figure of ỹ one, be rightе vnder the first of the other, & the second vnder the second, euery place correspōdent vnder other. That done, drawe a lyne vnder these seuerall sums, as is to se in the example folowing. And whē ye will adde your nūbers together, begin at ỹ firste places of your sums, & add all ỹ figures ỹ ye se in ỹ first places of all your sums together, & that ỹ cōmeth of ỹ addition se whe-

whether it bee diget number, article, or compost: If it be but diget, set that dyget beneath the lyne directly vnder the same firste places. If it be article, put a sipher beneath the line, ryght vnder the same first place, & reserue the article to be added to the nexte places of the summes, & there do lykewyse. If it be compost, set the diget vnder the lyne, righte vnder the same place, & reserue the article in your mynde, addyng it likewise to the next places of thy summes. Whē the figure standing in the last places of your sums be adioyned together if any article or articles remain, set thē down next to ẏ figure ye set last before vnder the same lyne, as here for example.

The fyrste summe.	6	7	8	9	4
The second summe.	3	4	5	6	7
The thyrd summe.	2	3	4	5	6
The fourth summe.	7	8	9	3	4
The fyft summe.	6	7	4	2	[illegible]
The syxt summe.	3	4	3	2	1
Summa totalis.	3	0	6	5	9

Youre figures set after this sort, adde all the figures that ye finde in the fyrst places of all the summes together, beginning at the neither most, saying: 2 & 5 is 7, and 4 that is 11. and 6 that is 17. and 7 that is 24, & 4 that is 28. Thys is the whole summe of the figures added together, whiche bee founde in the fyrst places: the whiche number is compost. Wherefore as it is in your rule, ye muste drawe a lyne vnder the whole summe, setting the dyget ryghte vnder the same place, beneathe the lyne. the whiche is 8, and keepe the articles in youre minde, which is 2. Nowe to the second place, toward the left hand, saying 2 that I haue in my mind & 2 is 4, and 2 maketh 6, and 3 is 9, and 5 is 14, and 6 is 20, and 9. is 29. nowe set the. 9 vnder 2 and keepe 2 in minde, & adde them to the fyrste fygure of the thyrde place, which is 3. Now saye, 2 and 3 is 5. and 4 is 9, and 9 is 18, and. 4. is 22, and 5 is 27, and 8, is 35. Nowe set 5 vn

der

ber 3, and kepe thee in minde. Now to the .iiii. place towarde the lefte hande, wher 4 standeth now 3 that you haue in minde, and 4 is 7, and 7 is 14 and 8 is 22, & 3 is 5, and 4 is 29. & 7 is 36. set 6 vnder 4 and kepe 3, & adde that 3 to the vndermost figure of the first summe that is 3, and saye 3 and 3 is 6, and 6 is 12. and 7 is 19 and 2 is 21, and 3 is 24. & 6 is 30. All the figures of thys place added together as you se, maketh article number, wherefore according to youre rule set a cipher o vnder that place beneth the lyne and the article whiche is nexte to the same cipher and all is finished. And al these summes thus collected together maketh 306598.

¶ An other example of Addition.

1	0	0	6	6	7	8	4	5
6	0	0	0	3	1	9	5	0
5	0	0	5	4	5	1	6	1
			8	9	1	2	0	2
					6	4	2	1
1	2	0	2	0	5	2	5	7	6.

Begyn fyrst as ye dyd before, at the first places adding them al together, beginning at the nethermost, saying: 1 & 2 is 3, and 1 is 4, and 5 is 9, thys is the whole summe of the figures standyng in the fyrst place, the which is diget number, and therfore accordyng to the rule, set it right vnder ỹ same place beneath the lyne. Then proceede to the seconde place, and begin at the neather end saying: 2 and 6 is 8, and 5 is 13, & 4 is 17, this number is compost number, therfore set the diget right vnder that place beneath the lyne, which is 7, reseruing the article in your mynde, and so to the third place, saying: 1 that I haue in my mynde and 4 is 5, and 2 is 7, and 1 is 8, and 9 is 17, and 8 is 25, thys number also is compost, wherefore set the diget 5 vnder that third place, and reserue the article 2 in minde to the next place, thē to the next place saying: 2 that I haue in minde & 6 is 8, and 1 is 9, and 5 is 14 and 1 is 15, and 7 is 22, this is also com-

poſt, therfore ſet the diget 2 vnder that iiii. place, & reſerue the article 2 to the next place. Then to the fift place ſaying 2 that I haue in my mind, and 4 is 6 & 3, is 9. and 6 is 15 thys is alſo compoſte number, ſet the diget .5. vnder the fyft place, and kepe the article in mind. To the .vi. place ſayinge, 1. that I haue in mynde and 8, is .9. and 5. is 14. and. 6. is 20. this is article number, therefore according to the rule ſet a cipher vnder the place beneth the lyne, & kepe the article in minde, and come to the vii. place in ỹ which places becauſe thou findeſt nothing but ciphers, to the which thou mighteſt adioyne tht artticle reſerued, ỹ whych was 2, therfore vnder the ſame vii. place ſet that ſame reſerued. 2. and then come to the .viii. place, & there findeſt thou nothig but ciphers, wherfore vnder the ſame place ſet beneath ỹ line a cipher, accordyng to the rule. Then come to the .ix. place & ſay: 5 and 6. is. 11. and. 1. is. 12. the which is compoſt num-

ber,

ber, therfore set the diget which is 2 vn
der the lyne, and reserue the Article in
minde, which is .1. now for because ther
is no mo places whereunto ye myghte
adde thys reserued article, therfore ac
cording to your rule ye shall set it down
next vnto the figure that ye dyd set vn
der the lyne laste, as in your example.
These twoo examples were sufficient
inoughe to the readynes of Addition.
how be it yet that it may be the plainer
I wyll subscribe an other example.

14699000	
38290200	
01091600	
10200000	
55100800	

¶ Adde the first place
together. First there
thou fyndest nothynge
but ciphers, wherefore
sette a cipher vnder the
lyne, and do so likewise
in the seconde place. In the thyrd place
thou fyndest .6. and .2. which maketh .8.
the whyche for because it is dyget num
ber, sette it vnder that place beneathe
the lyne.

In the .iiii. place is .1. and .9. which maketh 10, and because that this is article number, set a cipher vnder that place, beneath the line, and reserue the article to the next place, saying: 1 that I haue in my minde and 2 is 3, and 9 is 12, & 9. is 21, and 9 is 30, this is also article nũber, wherefore set a cipher vnder that place beneath the lyne, & reserue the article 3 in mynde to the next place. Then come to the .vi. place, saying: 3 that I haue in my mynde and 2 is 5, and 6 is 11, this is composte number, therefore I set the diget which is 1 ryghte vnder that place beneath the line, and reserue the article 1 to the next place, saying: 1 and 1 is 2, and 1 is 3, and 8 is a 11. and 4 is 15, thys is also compost, therefore set the dyget .5. vnder the lyne, and adde the article reserued to the figure in the next place, saying: 1 and 3 is .4. and 1 is 5, thys is nowe called dyget number, therefore set it vnder the lyne, and then all is finished.

¶ Cer-

Certayne examples to practise your selfe in, touching the exercise of Addition.

16768900	10000000
36219880	13456289
92000032	20020101
11116841	10000000
19421326	38921000
175526979	92397390

9090201000	640000
2651260000	860000
25432071	998000
21654000	780000
962000	590000
1000	100003
11789510072	3968000

900026	30002688
205812	1060986
901000	10009399
909619	10009399
100000	20009170
3916457	8064049

¶ Of the proofe of Addition.

For the proofe of Addition, ye shall make a crosse after the fashion that followeth, and then ye shall come fyrste to the addible summes, and plucke out all the .9. that ye fynde there, and the rest whatsoeuer it be, that wyl not make .9. set it at the vpper side of the crosse. The come to the totall sum vnder the lyne, and lykewise deducke all the .9. that ye can fynde there, and that that remayneth not able to make .9. set it at the vndermost part of the Crosse, and if it bee like the remenant of the addible numbers which standeth in the vpper part of the crosse, your worke is good, yf not it is nought, as by example ye shall the better perceiue.

¶ An example of the proofe.

A	2	5	0	6	7	0	
B	3	3	0	4	2	8	
C	5	8	1	0	9	8	

Now for to make the proofe of these numbers, ye shall begin at the fyrst fygure that ye haue made, in saying: 8. & 0. is 8, and .2. is .10. take awaye 9. then ther resteth .1. then 1. & 7 is 8. and 4. is 12. take away. 9. rest 3. then .3. & 6 is .9. thē to the two ciphers of nothing, that nothyng do signifie then 3. and 5 is 8. & 3. is 11. take awaye. 9. rest 2. then 2. and 2. is .4. this. 4. it behoueth you to put at the neather end of the crosse. Then come to the place of .C. vnder the line, & say. 8. (ye shal leaue the 9 & the cipher 0 that is nothing worth) & adioynt ther to and make it. 9. and leaue that, then 8 & 5. is 13. take away. 9. rest. 4. whiche 4. ye shall put at the vpper ende of the crosse, and then is your proofe good, for both the ends be like as ye see in this figure of the crosse. And at the twoo other endes ye shall put. 1 0 0 0, in certifying that of them commeth nothyng.

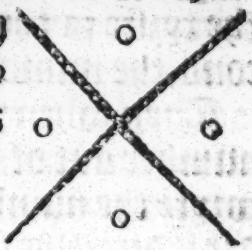
¶ Another example.

A	7	8	9	1	5	4	3	2	6	li.
B	4	9	3	0	0	6	7	1	5	li.
C	2	0	9	9	3	4	7	8	4	li.
D	4	6	0	9	4	5	5	3	0	li.
E	9	3	6	4	5	8	7	7	8	li.
F	4	4	5	1	9	3	0	0	1	li.
G	3	3	3	4	3	9	3	1	3	4 li.

We shall say semblably 1 and 8 is 9, & alwayes leaue them, then 0 that doth nothing then 4 & 5 ben 9, then 6. Then we shal return to the tenthes, and shal finde 0, that doth nothing, then 7, that maketh 9 rest 4, then 3 bene 7, then 8. ben 9 rest 6, then 1 is 7, then 2 is 9. The coine to the place of hundzethes, then 0 is nothing worth, then 7 and 5 is 9, rest 3, then 7 is 9 rest 1, then 7 is 8 and 3 is 9 rest 2. Then coine to the place of thousandes, and adioyne the 2 to the 3 that is 5, then 8 is 9 rest 4, & so consequently vnto the end. And if peraduenture we finde

fynde this figure, 9 because of the briefnes we shall leaue it. And shal finde at the ende 9, therefore we shall put at the ende of the crosse o, in signifieng that there is nothyng aboue 9. And so shall we do in the number of 6. and we shal find lyke 9, for the which semblably we shal put o And so is the Addition good and well made.

The proofe.



As touchyng of Addition in broken numbers, ye shall finde that vnder the tytle of Reduction hereafter.

¶ The ende of Addition.

¶ Of

¶ Of the thyrd part called Subtraction.

Subtraction is a maner of debating or subducting a lesse summe out of a greater, or lyke of lyke, shewing what remaineth.

In Subtraction are two numbers, the fyrste is the nnmber abated, the second, the number abating.

Then when ye wil subtragh any one number out of an other: fyrst ye shall wryte the number to be abated and vnder it directlye figure vnder figure, and place vnder place wryte the abatour, & beneath these twooe summes drawe a lyne, then begyn your Subtraction at the fyrst places, and subduce the figure stãding in the fyrst place of the abatour of the fyrst figure standyng in the fyrst place of the number to be abated, and the rest that remaineth after the abatement set it righte vnder the same place beneath the lyne, and so do likewyse in the secõd, the thyrd, and al other places And when ye haue al done, the number

that

that shall remaine vnder the lyne, shall be that that remaineth after ỹ subduction of the abatour of the number abated. As for example.

Lent. 83456
Payd. 41131
Rest. 42325

I lent a mã. 83456 li. of the which hee hath paid me 41131 li. again, now I desyre to knowe howe muche remayneth. Then according to the rule, fyrste I set the lent money a right vnder that I set the repayd money, figure vnder figure, & place vnder place, as ye see by the example. Under both these summes I must draw a lyne. Begyn to subtraghe the vnder sum out of the vpper, saying: 1. out of, 6. remaineth .5. this .5. ỹ remayneth according to the rule set vnder the same place beneth the lyne, then to the second place, pluck 3. out of 5. remaineth 2. set ỹ vnder the lyne, then to the thyrd place, pluck .1. out of 4. remaineth .3. set that vnder the lyne: then to the fourth

place

place, take 1 out of 3 remayneth 2, set it vnder the line: thē the fift place, take 4 out of 8 remayneth 4, set that also vnder the lyne, and so thou hast finished. Then thou shalte vnderstande, that it which is vnder the line is the remanēt of the money not yet payd.

An other example.

87660 li.
67560 li.
20100 li.

Begin at the fyrst place saying: 0 out of 0 remaineth nothing, set the figure of nothyng vnder the line: thē to the second place 6 out of 6 remayneth nothing, set the cipher vnder the lyne. Then to the third place, 5 out of 6 remaineth 1, set 1 vnder the line. Then to the fourth place 7 out of 7 remayneth nothyng, set the figure of nothing vnder the lyne. Then to the fyfte place, take 6 out of 8 remayneth 2, set 2 vnder the lyne, & thus thou hast done. Then 20100 remaineth yet to be paid.

Now thou shalt note that sometyme it chaun-

If chaunceth that the fygure standynge beneath is greater then the figure standyng aboue hym, in the summe from whom subduction is made: in this case thou shalt in thy mynde put ten, to the fygure in the vpper summe, and then subtraghe the neather figure out of the same, set the remanent vnder the lyne, and for ỹ same ten the which thou didest put to ỹ vppermost figure to make him greater, thou shalt adde one to the nexte fygure standynge in the neather summe, and then subtraghe that lykewyse oute of the fygure aboue hym, yf the fygure aboue be bigger then the figure beneath with his addition, either els equal, and that remayneth, set it vnder the lyne, as ye dyd in the other example. If the figure aboue be lesse then the figure beneath, thē do to him as ye dyd to the other before, that is to saye: ad ten to him, and so forth in all other places. Where the neather figure of the abatour is greater, then the vpper fygure

gure from whence it shoulde bee abated, as by thys example ye shall more clearely perceaue.

¶ An example.

5 7 2 9 5 4 9 0
4 8 7 6 5 2 9 7
0 8 5 3 0 1 9 3

Begin your subtraction, saying: 7 out of 0 that cānot be, therefore for because that 7 standing in the neather sum is more then the fygure standynge in the fyrste place of the vpper sum, ye must adde a ten, then deduct your .7. out of .10. and there remayneth .3. then come to the second place, & for the 10 that ye borowed in your minde & added it to that figure in the fyrst place to make it byg inough for the fygure vnder it to be subducted out of it, for the same ten (I say) ye shall put to the nexte fygure in the neather place of the neather sum .1. then say .9. & 1. is .10. then subduct this .10. out of the figure of 9 standing aboue it in the vpper summe, & that ye cannot, therefore

do as you did before in the fyrste place, put.10.to the.9.in your mynde, saying: 10.and.9.is.19 then deducke the.10.beneath out of the.19.aboue,and there remayneth 9 to be set vnder the line, thē to the figure standing in the third place in the neather summe,put 1.for the ten that you borowed in youre mynde, the which ye added to 9.in the second place of the vpper sum to make it greater,saying.1.and 2.is.3.subtragh that 3.oute of 4 aboue it,remayneth 1.to be set vnder the lyne. Then to the fourth place, take 5.out of 5.remayneth nothing, set a figure of nothing vnder the lyne, and come to the.v.place,take 6.out of 9.remayneth.3.to be set vnder the lyne, so to the.vi.place,take 7.out of 2,that can not be, therfore put to the same 2.according to thy rule.10,& then it is 12, then subduck.7.out of.12.remayneth 5 to be set vnder ỹ lyne,& for the same.10.that thou borowedst in thy mynde to putte to the fygure of.2.in the vpper summe,

thou

thou shalt adde 1 to the figure standing in the next farther place in the neather sum, comming to the same place which is the seuenth place saying: 8 and 1 the which I haue to set to hym is 9, then 9 out of 7, that I cannot, wherefore like wyse agayne I muste helpe the sam 7 with a ten, and then it is 17, out of tha now subtragh your 9, and remayneth 8 to be set vnder the lyne: nowe as you haue done before in all other places for the 10 here borowed and adioyned, th adde 1 to the next figure standing in th seuenth place of the neather number saying: 4 and 1 is 5, then subduct this out of the 5 aboue, and remayneth no thing, wherfore set a figure of nothyng beneath the line, and so you haue done

Now be it ye shall note that when y haue a cipher to bee wrytten in the las place of any summe, ye shall not wryt it, for in the last place it signifyeth no thing of it self, neither doth it augmen the signification of any of the other.

Be

Yet one other example wyl we set, & then make an end of subtraction.

1000081007100	Ye shall begyn
48405748 0087	saying: 7. out of
51602352 7013	0, that cannot be,

for ye cãnot take 7 out of nothing, wherefore as ye haue done alwayes in the example afore, put ten to that cipher, & that maketh 10, thẽ deducke your 7 out of it now, and ther remayneth 3 to bee set vnder the lyne. Then for this ten that ye ad to the fygure in the first place of your vpper nũber, set 1 to the figure standing in the second & next place of the neather nũber saying: 8 and 1 is 9, then 9 out of the cipher aboue, that cannot be, therfore as ye did before make that 0. 10, and then subducke your 9 out of thys added 10, remaineth 1 to be set beneath the line, thẽ for this ten likewise that you borowed in the seconde place of your vpper number, ye shall set one to the next figure stã

dyng in the thyrde and next place of the neather summe, sayinge .1. and the .0. is one, thē take that .1. out of .1. aboue hym remaineth nothinge, set a figure of nothyng beneath the line, then to the .iii. place take the .0. out of 7. aboue remayneth .7. still to be set vnder the line. So to the .v. place, take 8. out of 0. that ye cān not, therfore put .10 to the cypher, & then subduck it, and remaineth 2. set that vnder the lyne: for this ten adde .1. to the next fygure in the .vi. place, which is .4. then .4. and .1 is 5. & .5. out of .0, that ye cānot, then make .0.10. & take the .5. out of it remaineth 5 to be set vnder: thē for the borowed tenne, lykewyse set to the next figure in the .vii. place of the neather number 1 saying: 1 and 7 make 8 & 8 out of .1. that cannot be, therfore put ten to that .1, and then .10 and 1. is 11 out of this .11. deduck your 8 remayneth 3 to be set vnder the lyne: then for this .1., to the nexte figure in the .viii. place of the neather summe, set 1 saying: 5. and 1 is 6

then

thy 6 out of 8 remaineth .2 then to the ix. place, take 0 out of 0 remayneth also 0, set that vnder the lyne, in the .x. place take 4 out of 0 that cānot be: therefore put .10 to that 0 and subduck your 4, remaineth 6 then to the figure in the next place which is the xi. place, put i. saying 8 fro i is 9. then 9. out of 0, that cannot be therfore put ten to it, and then subtrah your 9 out of 10 remaineth i. set it vnder the lyne: for this borowed ten put .i agayne to the next figure whiche is .4. saying: 4 fro i is .5. 5 out of 0 that cannot be, therfore likewise againe make it .10. and then take 5 out of it, remayneth .5. thē again for your borowed 10 so haue .i. to the next place. But because there are no mo places, therefore subtraghe it alone out of the figure aboue, sayinge: i out of i. remayneth nothing, therfore nothing is to be set vnder the lyne, not so muche as a cipher, for because that it is in the last place. So then the summe vnder the line, is the remaine that remaineth

after the subtraction of the lower sum, out of the vpper summe.

¶ The proofe of Subtraction.

The proofe whether ye haue subtragh-ed well or no, ye must adde the remaine to the number payd, and if they twaine added together doo make the first sum lent completlye, then is it wel subtragh-ed: if not, it is not well subtraghed, as by the lacke example ye maye well per-ceyue. For by the rule of Addition adde 3. to. 7. therof commeth 10, set the cipher vnder the lyne, and reserue the article to the next place fourth according to the rule of Addition, and thou shalt see these two summes added toge-ther, to come to the fyrst lent sum. And this of Subtractiō shalbe sufficient.

(.·.)

¶ The

¶ The fourth part called Multiplication.

Multiplication is a maner of encrealynge or augmentyng one sum by another. In thys feate of multiplication are .3. numbers to be noted, the multiplied number, the multiplier, and the number that redoũdeth of the multiplitation of the multiplied number by the multipliar, as in example. Multiplye this number 4 by 3, and thereof come 12. 4 is the number multiplied, 3 is the number multiplyer, and 12 the thyrde nnumber that redounded of the multiplication of one of these nũbers by the other. Then for more experience and ready working in thys kind of operation, ye shall perfectly know by memory the multiplication of one diget by an other, the which ye shal haue here in this table following. Of the whych one diget ye shall locke for in the heade of the table, and the other on the leafte syde of the Table.

¶ The Table.

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

By thys table ye shal sufficiētly learn to multiplie one diget by an other, as for example: If ye wil multiply 9 by 5, loke for the 9 at the head of the table, & for 5 ỹ multiplier at the left syde of ỹ table, then with thy finger descende down frō the place wher 9 standeth till ỹ come before the place wher ỹ 5 standeth, & there in the same angel ỹ shalt find 45 & that cōmeth of 5 times 9, & thus by al other.

There

Ther is also a proper rule for the multiplication of one diget by an other & it is this. whē thou wilt multiply one diget by an other, note the distance of the greater diget from.10.& by the same distance multiply the lesse diget or equall & that ẏ procedeth of it, deduct out of ẏ article whom the lesse number doth denominate, & the reste is it that ye seeke for. as for example: if ye wil multiply 7 by 5. first se ẏ distance betwene 7. which is the greater number & .5 & that is.3. by this 3 multiply 5. that is 15, thē subduck this 15. out of the article that 5 the lesse number doth denominate, whiche is.50 then remaineth 35 that is 5 tymes 7: so likewyse shall ye do if the multiplicar and the multiplied be like. Now beit most ready it is to know wout boke very perfitely the multiplicatiō of euery diget one in an other. Now whē ye wil multiply anye one nūber the one by the other, first write fayre your nūber to be multiplied, & vnder it ẏ multiplicatou

beneathe both theſe ſummes, ye ſhall
draw a lyne. Then ſhal ye conſider whe
ther your multiplier bee a diget or ar-
ticle, or els compoſt number. If it bee
diget number, ye ſhal begin to multiply
by the diget the figure or diget ſtanding
in the fyrſte place of the number to bee
multiplied, and that that commeth of it
if it be but a diget, ſet it vnder the lyne,
ryghte vnder the ſame place, and then
proceede further to the nexte place, and
multiply the figure ſtanding in ỹ place,
by the ſame multiplier, and that that re
boundeth of it, if it be a diget, ſet it like-
wyſe vnder the lyne, ryght vnder the
ſame place, and ſo doo lykewyſe in eue-
ye place following, vntyll ſuche tyme
as all the figures ſtandyng in euerye
place, be multiplied. Then that whych
ſhal bee founde vnder the lyne, is the
ſumme comming of the multiplication
of theſe twoo numbers, the one by the
other. As by example ye ſhall the bet-
ter perceiue.

If

2 3 1 4
2
4 6 2 8

If ye wyll multiplye thys summe 2314, by thys 2 ye shall set your fygures after thys sorte, as ye see them. Begyn your multiplication saying: 2. tymes 4 is 8, set that 8 vnder the lyne, then come to the next place and saye: 2 tymes 1 is 2, set it vnder the lyne, then to the third place, 2 times 3 is 6, set that vnder the lyne, so to the fourth place, 2 tymes 2 is 4, set that vnder the lyne also, and then thou hast done, so that this number 4628 vnder the lyne, is it that commeth of the multiplication of thys summe 2314 by thys number 2. But if it bee so that in the multiplication of any figure in the number multiplicable, by the multiplier that it which redoundeth of it be article number: thē ye shall set a cipher beneathe the lyne, ryght vnder the same place where the multiplicatiō is, and reserue the article to be added to the number that proceedeth of the multiplication of the figure

in

in the next place by the aforesayd multiplyar, the whych likewyse if it amount to an article doe likewise as I bad you to do in the fyrst place: but if it be compost number, then shall ye set the dyget vnder the same place beneath the lyne, and reserue the article to be added lyke wyse, as is before sayde of article number, as in this example.

8 1 4 1 6 4 2

5

4 0 7 0 8 2 1 0

If ye will multiplye thys number 8141642 by this fygure 5: Begyn at the fyrst place sayinge: 5 tymes 2 is 10: now because that thys number is article, ye shall accordinge to the rule before set the .0. vnder the lyne, and reserue the article .i. to be added to the nũber that proceedeth of the multiplication of the next figure, standinge in the nexte place of the sum multiplicable, by the multyplyer: so then come to the next place sayinge: 5 tymes 4 is 20, to thys 20 adde .i. for the article that ye reserued, and that maketh

maketh.21, therfore because that this is a compost number, therefore set the dyget vnder the lyne, beneathe the same place, and reserue the article to the next place. Then come to the third place saying: 5 tymes 6 is 30: to this add the article 2 which ye reserue in the place nexte before, and then it is 32, set the dyget vnder the lyne as ye dyd before, reseruynge the article to the next place: then come to the fourth place saying: 5 times 1 is 5. to this adde the article reserued, whiche is 3, and that maketh 8, set thys dyget number vnder the lyne, and then come to the. v. place saying: 5. tymes. 4. is. 20. now because this number is article, set a 0. vnder that place beneathe the lyne reseruing the article. 2. to be added vnto the nexte places: Then come to the. vi place, saying 5 tymes 1. is 5, to thys adde the article 2. reserued, & then it is 7. set it vnder the lyne, then to the seuenth place, saying, 5. tymes 8 is. 40. nowe because it is an article number,

ye shall

ye shall set a cipher vnder the lyne, and reserue the article 4 to the next place, & for as muche as there is no mo places, ye shall set thys 4 vnder the lyne nexte vnto the o that ye set downe last, and then ye haue done.

When that your multiplyer is compost or article number, thē shall ye take the first figure of your multiplier, & by him shal ye multiplye all the figures of the multiplicable numbers, setting alway that that amounted of it beneath the lyne as ye dyd before. And when ye haue multiplied the number multiplicable by the fyrst figure of the multiplier: then multiplye it agayne by the second figure of the multiplier, setting euermore the firste figure of the number multiplicate, directlye vnder the figure multiplicatour, in what place so euer it stand: and the number multiplicable is multiplied by al the figures of the multiplicatour, then make a strike vnder them al, addyng al the numbers multiplicate

plicate together as they ſtand, and that which proceedeth of that additiō, is the number multiplicable, now multiplied by the whole number multiplicatour, as by thys example ye ſhall playnlye perceyue.

			2	3	4	5	
			1	2	3	4	
			9	3	8	0	
		7	0	3	5		
	4	6	9	0			
2	3	4	5				
2	8	9	3	7	3	0	

¶ If ye wyll multiply this number 2345 by this number 1234, ſet them fyrſt as ye ſee here. 2. vnder theym drawe a lyne, then begyn wyth the fyrſt fygure of the multiplicatour, whych is 4, and by him firſt accordyng to the rule multiply all the multiplicable number throughout, ſayyng: 4 tymes 5 is 20, ſet the cipher vnder the lyne, reſeruing the article 2 to the nert place. Then to the ſecond place, 4 tymes 4 is 16. to that put your reſerued article 2, and it is 18,

ſet

set the diget.8. vnder the lyne, seruinge the article.i. Then to the thyrd place 4. tymes 3 is 12, and i reserued from the place before that is ,13. set the diget 3 vnder the lyne, reseruing the article.i tē to the fourth place.4. tymes 2 is 8, and i.reserued is 9, sette that diget 9 vnder the lyne, and so haste thou multiplyed this number multiplicable by the secōd figure of multiplicatour. Now then accordyng to the rule afore multiplye the multiplicable number by the second figure of the multiplicatour, sayinge: 3. tymes 5 is.15, set the diget.5 vnder the lyne, according to the rule whyche byddeth to set euermore the fyrste figure of the number multiplicate vnder ỹ place where the figure multiplicatour dothe stand: as here nowe thou multiplieste the multiplicable by the seconde figure of the multiplicatour, whyche is three, then say: 3 tymes 5 is 15, set thys dyget 5. vnder the lyne, and beneathe the fyrst number multiplicate. ryght vnder

the

the figure multiplicatour, as thou seest in the example, and reserue the article. i then to the second place of the multiplicable. 3 tymes 4. is 12, and 1. that is reserued is 13 set the dyget. 3. vnder the lyne, as ye see in the example, & reserue the article. i. and so to the thyrd place. 3. tymes 3. & 9. and 1. reserued is 10. set a 0. vnder the lyne, and reserue the article 1. So to the .iiii. place saying: 2 tymes .3. is 6. and 1 reserued is .7 .set it vnder the lyne, thus haue ye done your multiplycation by the second figure of the multiplicatour. 3. Then take the third figure of multiplicatour, which is 2. and multiply also al the numbers multiplicable by hym saying. 2. tymes 5. is. 10. set the 0. beneath the lyne, ryghte vnder the place, where this figure 2. the multiplicatour standeth, as ye se in the example & reserue the article. 1. then to the second place. 2 tymes. 4. is 8, & 1 reserued is 9. set ỹ 9 vnder the lyne: thẽ to ỹ iii. place. 2. tymes 3. is 6. set that vnder the lyne.

So

So to the fourth place saying: 2 tymes 2 is 4, set that 4 vnder the lyne. Nowe begyn to multiply with the fourth, and last figure of the multiplicatour, saying 1 tymes 5 is 5, set the 5 vnder the lyne, as I sayde before, and as ye see in the example, thē to the second place, 1 times 4 is 4. set that 4 vnder the line, then 1 tymes 3 is 3, set that 3 vnder the lyne, then 1 tymes 2 is 2, set that 2 vnder the lyne, and ye haue done your multiplication. Then must ye adde according to your rule afore all this single multiplied number together, and that which cōmeth of the Addition, is the number that commeth of the multiplication of thys number 2345, multiplicable by the number 1234, multiplicatour. Then come to the fyrst place, & se what is there, and there ye shall finde a 0, set it vnder the lyne, and so to the seconde place, there ye shal fynde 5 and 8, which is 13, set the diget 3 vnder the lyne reseruing the Article 1 to be added to the

nexte place: then come to the .iii. place, there is 0,3 and 3 which is 6, to that add the reserued 1, and that is 7, set that 7. vnder the line, now to the fourth place 5. 9. 0. and 9. maketh. 23 set the 3. vnder the lyne. reserue the article 2. So to the fift place, 4. 6. and 7 is. 17, to that adde the reserued 2, which maketh 19, set the 9. vnder the lyne, and keepe the article one in mynde. Then to the syxt place, 3. and 4 is 7, and 1 reserued is 8 set it vnder the line. Then to the seuenth place, there fynde ye but .2, wherefore sette it vnder the lyne, and then haue ye done. So that this summe vnder the lyne 28237390, is the whole number multiplicate.

Here followeth an other example of Multiplication.

A	642600 3
B	502000
	000000000
	00000000
	0000000
	1285 2006
	0000000
	3213 0015
C	322585306000

Your fygures set after this sorte A is the multiplicable number, B. is the number multiplicatour, C. is the number multiplicate, which commeth of the addition of al the seuerall numbers together standing betwene the lynes. Begyn then your woorke, taking the first figure of B. the multiplicatour, whych is 0, & by him multiply al the figures of A. the multiplicable, and that that proceedeth of it, set vnder the line as ye see & so to the second figure of the multiplicatour, which is also 0, multiplye all the

figure

figures of A. by it likewise, and set that which cōmeth of it vnder the line, ryght vnder the second place, where the multiplicant fygure standeth. Then to the third figure, which is also 0, multiplye all the multiplicable number A. and set that which cōmeth of it right vnder the thyrd place beneath the lyne, as ye see playne in your example. For of the multiplicatiō euermore by ciphers cōmeth nothyng but ciphers. Nowe to ỹ fourth place of B. the multiplicatour ther shal ye fynd the figure 2 multiply then al A. the multiplicable nūber by thys figure 2 saying: 2 times 3. is 6, set that 6 vnder the lyne, right vnder the place wher the multiplicatour 2 standeth, as it appeareth in your example. Then to the second place, 2. tymes 0 is nothyng, set that 0 vnder the lyne, nexte the afore sayde. 6, and so to the thirde place, 2 tymes 0: is nothyng, sette the fygure of nothynge downe vnder the lyne, and so to the fourth place, 2 tymes 6 is 12, sette the

diget 2 vnder the lyne, and reserue the article 1 to the nexte place. Then come to the fyfte place, 2 tymes 2 is 4, and one that I reserued is 5, set that 5 vnder the lyne. Nowe come to the fyrst place, saying: 2 tymes 4 is 8, set that 8 vnder the lyne. So to the .vii. place, 2 tymes 6 is 12, set the diget 2 beneath the lyne, and reserue the article 1 to be set in the nexte and last place, as ye see in the example. Thus haue ye multiplied A. the multiplicable by 4. fygures of B. the multiplicatour, therfore now take o the fyfte figure of the multiplicatour & by it also multiply al the figures of A. the multiplicable, & thereof shal come all ciphers to be set vnder the line, as ye see here in the copy. Then to the .vi. figure of B. the multiplicatour, which is 5, by thys 5 also multiplye all the figures of A. the multiplicable, sayinge: 5 tymes 3 is 15, set that 5 beneathe the lyne, ryghte vnder the fyrst place, where the multiplicatour standeth, as is to bee seene in the

copy

copy, and reserue the article to the next place. Then come to the seconde place & say: 5 times 0 is nothing, set the 1 which ye reserued in your mynde vnder the lyne, and so to the third place, saying: 5 tymes 0 is nothing, set the 0 vnder the lyne. Then to the fourth place saying: 5 tymes 6 is 30, set the cipher vnder the lyne, reseruing the article three vnto the next place. Then come to the .v. place, saying: 5 times 2 is 10, and 3 that I reserued is 13, set the diget 3 vnder ỹ lyne, and reserue the article 1 to be added to the next place. So to the .vi. place saying: 5 times 4 is 20, and 1 reserued is 21 set the diget 1 vnder the lyne, reseruyng 2 the article to the nexte place. Then to the .vii. and last place, saying: 5 tymes 6 is 30, and 2 that was reserued is 32, set the dyget vnder the lyne, and reserue 3 the article to be set in the next and last place beneath the line, as ye may se in ỹ example, and so is al finished. Then vnder al these particular summes drawe

lyne, and adde all them together, leftyng euer that whyche commeth of the addition vnder the lyne, as is in the example, the whyche shall amount vnto thys summe, 322585350 6000, and thys is it that commeth of the multiplicatiō of the summe A. by the summe B.

Certayne examples of multiplication, in the which ye may exercise your selfe, to be the more practised in it.

	A	3452367
To multiply by.	B	8892539
		31071303
		10357101
		17261835
		6904734
		1071203
		27618936
		27618929
Sum.		30700308189819.

¶ Two other examples.

64970	7432
To mul. 13	To mul. 324
194910	29728
64670	14864
	22296
Sum. 844610	Sū. 2407968

As for the multiplication by squares is neyther worthy the writing, nor the readyng. And where as in other copies is set duplacion, triplacion, and quadruplacion, all that is superfluous, for so muche as it is contayned vnder the kinde of multiplication, and they that are expert in this feate, maye right well perceiue it.

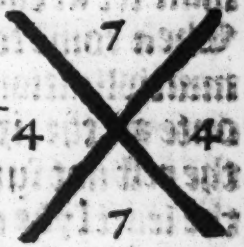
¶ The proofe of multiplication.

The proofe of multiplicatiō may be by 2. meanes, by the subducting out of all the 9.s the second waye is by partition. As cōcerning the first way, ye shall first

make a Crolle, then beholde the multiplicable number, and subdue out of it all the nynes, and that that remayneth not able to make 9, set it at the vpper end of the crolle. Then come to the multiplicatour, and doo lykewyse in hym, and that whych remaineth (al the nynes subduced) set it at the vnder part of the Crolle. Then multiply the figure standing in the vpper part of the Crolle by the figure standing in the neather part of the Crolle, and out of the same that commeth of it, take 9 as ofte as ye can, and that that remayneth not able to make 9, sette it at the ryght syde of the Crolle. Then come to the totall summe multiplicate, and subdue all the nynes out of hym lykewyse, and that whyche remayneth not able to make 9, set it at the leaft syde of the Crolle, and if it bee lyke the figure standyng at the ryghte syde of the Crolle then it is well, other wise it is not. As here by ensample ye shall perceyue playnly.

Of Multiplication.

¶ An example of the proofe.



A	7963	7
B	1852	
	15926	4
	39815	
	63704	7
	7963	
C	14747476	

To know whether the summe C. be the very summe which commeth of the multiplication of A. by B. then fyrſt caſt out all the 9 that ye fynde in the multiplicable A. and the reſt ſet it at the vpper ende of the Croſſe, whyche ye ſhall fynde to be 7. Then to the multiplicatour B. do lykewyſe, and ſee what remayneth, & there remayneth alſo 7, ſet that alſo on the neather end of the croſs, then multiplye thys 7 ſtandyng in the vpper end, by 7 ſtanding in the neather ende, and thereof commeth. 49. When thou haſt taken all the 9 out of thys 49

ther

there wyll remayne 4, the which thou shalt set at the right syde of the Crosse. Then come to C. the totall sum of the multiplication, and there lykewyse take oute all the .ix. that ye fynde there, and the rest not sufficient to make 9, set it at the leaft syde of the Crosse, the whyche thou shalt find to be .4. and for because that thys 4. to be set at the leaft side, is lyke the fygure standyng in the ryghte syde (for that is 4 also) therefore thys multiplication is good and well made: and so shall ye fynde it lykewyse in all other examples.

The proofe by Partition is to deuide the totall summe C. by the multiplicatour B. and if the quotient bee iust A. then is it well multiplied, otherwyse it is not. But thys waye can ye not practise, vntyll such tyme as ye haue learned the feate of Partition.

¶ The end of Multiplication.

¶ The

¶ The fyfte part called Partition.

Partition is a part of Algorisme, by the whych ye may easelye deuide any greater summe by a les or equal, shewing how often times ỹ diuisor is cõtained in the nũber diuisible.

In thys feate of Partition be foure numbers to be noted, the number diuisible, the number diuisor, the quotient, and the remayne, if there be any.

Before you come to Partition it shal be very needefull and necessary for you, right perfitly to know the table of multiplication of digets, which is set in the chapter of multiplication. For vnlesse that ye know that perfitly, ye shal sticke greatlye, not onelye in multiplication, but also in thys feate of Partition, and that exactlye had in memorye, the rest shall be farre easier, as for example. If ye wyll knowe howe often tymes 7 is contayned in 68. imagin by and by that thys 7. shoulde bee contayned 8 tymes, then

then if ye know without the booke perfectly the forsayde table, ye shal se that 8 tymes 7 is but 56, ergo 7 is contained more then 8 times in 68. Imagine then and suppose it to be 9 times in 68, then by the table see what 9 times 7 is, and you shal se that it is 64, wherfore thou mayest conclude that in 68, 7 is contained 9 tymes and 4 ouer.

No.	2	3	4	5	6
	4	6	8	10	12
	6	9	12	15	18
	8	12	16	20	24

Quotiens. 15077. 3. Diuisor.

The proofe.

To deuide this number 45231, by 3, the 3 is diuisor. First ye shall set downe your numbers to be diuided, and at the end of that number on the ryght hande

ye

ye shall make a stryke wherein ye shall set your quocient, and then set downe your diuisor which is 3 vnder the figure that standeth at the vttermoste ende at the left hand that is vnder 4, and then say: how many tymes 3 may I haue in 4. once 3, and 1 remayneth ouer set one within the strike, and that 1 that remaineth set ouer 4, then strike the diuisor 3 with a dash of your pen, and set the diuisor 3 vnder the figure 5, then ioyne the article one to the dyget 5, and it is 15, then say, how many tymes thre maye I haue in. 15. 5 tymes. 3. sette that 5 in the stryke, next to the figure. 1. and close vp the article. 1. and the diget. 5 with a cypher ouer eyther of them, and the strike the deuisor 3. w a dash of your pen, & set the deuisor. 3 vnder the third figure 2. & se how many tymes 3 ye may haue out of 2. none, therfore set downe a cipher 0 within the strike next to the figure 5. & strike out your deuisor wyth a dashe of your penne, and set the deuisor 3 vnder

the

the fourth figure 3. then ioyn the article 2. to the diget 3. and that maketh. 23. then see how many tymes 3. ye may haue in 23. 7. tymes 3, and 2. remaineth, set that 7 within the strike, nexte to the cipher, and the 2. that remayneth set ouer the fourth figure 3. and close vp the article 2 wyth a cypher, then strike out the diuisor, and set it vnder the first figure one at the right hand, then ioyne the article 2. to the diget 1, and it maketh. 21, then see how many tymes 3. ye may haue in 21. 7. tymes, and nothing remayneth, the set the 7 withyn the strike, and close the article 2. with a cipher 0 ouer eche of them, and strike out the diuisor wyth a dash of your pen, and so the third part of 45231 is 15077.

The second example.

Nom. 0 5 0 / 0 3 4 5 / 6 6 6

6. Diuisor.
Quotient.
390. 5 part
0

The

The 6 pzooke.

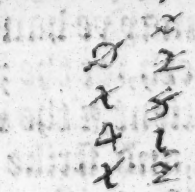
To deuide thys number 2345 by 6, the 6. is the diuisor, begin your diuision at the leaft hand, as is layde in the fyrſt example, and let your diuisor vnder the third figure 3, for ye may not haue 6 out of 2, and therfore say, how many tymes 6 may ye haue in. 23. 3, and 5. remaineth. set the. 3. within the ſtrike, and the diget 5. that remayneth, set it ouer the ſecond figure, and cloſe the article 2. wyth a cipher 0 ouer it. and then ſtrike out the diuisor with a daſh of your penne, and ſet your diuisor agayne vnder the thyrde figure 4, and then ioyne the article 5. to the diget 4, and it is 54, then ſee howe many tymes 6 ye may haue in. 54. 9. and nothyng remayneth, ſette the 9. wythin the ſtrike, and cloſe vppe the article 5. and the dyget 4 wyth a cipher 0 ouer either

eyther of them, and strike out the diuisor with a dash of your pen, and set the diuisor vnder the fygure 5 and say: how many tymes 6 may ye haue out of 5, no tymes, therefore set downe a cipher 0. with the stryke, and let the 5 stand, and strike oute the diuisor wyth a dashe of your pen, and so the 6 part of 2345. is 390, and the 5. that remayneth sette at the ende of the quocient in this maner, $\frac{5}{6}$ and so the quotient is 390. $\frac{5}{6}$

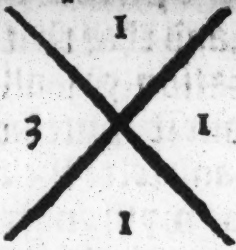
¶ To deuide by 2. or 3. figures, or by as many as pleaseth you.

Fyrst set downe your number to bee deuided, and your diuisor vnder it; beginning at the left syde, at whyche a place as ye maye take the last fygure of your deuisor in the last end, and then se howe oft ye mai haue that figure in the figure aboue it, and that set apart for your quocient, wyth the whych quotient, ye shall multiply euery figure by it selfe, of your

your diuisor, and that that commeth of the multiplication, ye shall abate of the figure right ouer it, putting out that other figure, and sette the rest aboue it, and so worke with euerye figure by it selfe, throughout the diuisor. Then renewe your diuisor one figure forward, toward your right hande (as before is rehearsed) and so continue your worke following to the first figure of your nũber to be deuided. Thẽ it is to be noted that if it hap that your multiplied number that ye should abate, be more then the number ouer it, then for a generall rule, ye shal not take your diuisor out of the figure aboue it, except that it maye sufficiently yeld inough to al the abatementes of the residue, as more playnly shal appeare in the example following.



No. | Quotient. 343. 2/12 | 2 Diuisor.

The  proofe.

Fyrst set downe thys number 4123. & deuide it by your diuisor 12, begyn your worke at your leaft hande, settyng the article 1 of your diuisor vnder 4, & the diget 2 vnder the thirde figure 1, & than se how many times the article 1 of your diuisor ye may haue in the 4 ouer it, ye would say 4 tymes 1, but that can not be, because there ye maye not haue the quocient 4 multiplyed with the diget 2 of your diuisor, for therof commeth 8, & then that 8 ye may not take out of 1. ouer the diget 2. Therefore saye agayne: how many times 1. may ye haue in 4, 3. times, and 1 remaineth, set the 3. within the strike of the quotient, & the 1 that remayneth set ouer 4, and strike out the article 2 of your diuisor with your pen.

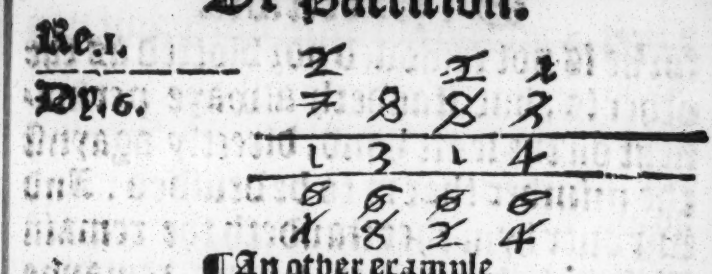
Then

Then multiply the quocient 3 with the diget 2 of your diuisor, and thereof commeth 6. Then ioyne the article one that remayneth, and the diget one, and it is 11, therout take 6, and there remaineth 5 set the 5 ouer the thirde fygure 1, & close vp the article 1 ouer 4 wyth a figure ouer it, and strike out the diget 2 of your diuisor agayns but one figure forward as thus: set the article 1. vnder the third figure 1. in the No. and the diget .2. vnder the second figure 2. and then se how many times 1. ye may haue in 5. that remayneth .4. tymes, and yet there remaineth .1. which must be set ouer 5. & strike out the article 1 wyth your pen. Then multiplye the dyget .2. of your deuisor with the quocient .4. and it is .8. then ioyne the article 1 that remaineth, and the dyget 2 in No. together, and it is 12. then take 8 out of 12. and there remayneth 4, set that .4. ouer the seconde fygure 2 in the No. & close vp the article 1 with a cipher 0 ouer it. & strike out the

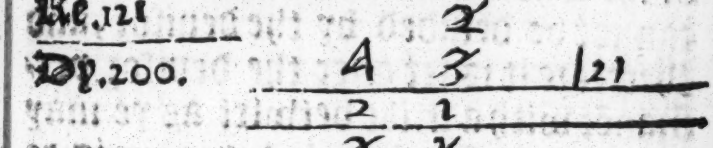
dyget.2. of your deuisor with your pen Then renewe youre deuisor againe, as before is layde, and set the article 1 vnder the seconde figure No. and then see howe many tymes 1 ye haue in 4, that remayneth .3. times and 1 remayneth, set that 3 wythin the strike for the quotient, and the one that remayneth sette ouer the 4, and strike out the article 1. of your diuisor with your penne. Then multiply the quocient 3 with the diget 2 of your diuisor, and then it is 6, then ioyne the article 1 that remayneth, and the dygette 5 in No. and it is 13. Then take 6 out of 13. and there remayneth 7 set that 7. ouer the dyget 3 in No. and close vp the article 1. with a cipher 0 ouer it, and strike out the diget 2. of your diuisor, and then the 12 part of 4123 is for the quocient 343, and the 7 that remayneth shall be set at the end of your quotient, as thus $\frac{7}{16}$

¶ An example.

Re. 1.

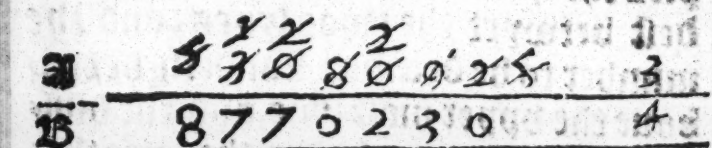


An other example.



We shal note that in these two examples the quotient standeth in the myddest betwyxt the twoo lynes, and the number to be deuided standeth next aboue the vpper most lyne, and the diuisor standeth nexte vnder that neather lyne. But then ye must marke that ther be two diuisors, one is called the diuisor currant, because it is alwayes remouable toward the right hand in the operation, and also it is stricken out, & this diuisor standeth alwaye vnder the neather lyne of the quotient. The other diuisor is called the diuisor permanent,

for he is not remoued nor blotted as the other is, but standeth alwaye permanent on the leaft hand, directly agaynst the number that is to be deuided. And iuft ouer hym ther standeth the remain of the whole number, whych remayne cannot be deuided by the deuifor, and therefore it is fet ouer the deuifor permanēt with a ftrike betwixt as ye may fee in the fyrft enfample, wher one is remayning, and 6. is deuifor.



For as muche as in this example we cannot take 4 which is the diuifor, out of 3, therefore wee fhall fet 4. vnder 5, and faye, how manye tymes 4 haue ye in 35, ye haue 8 tymes 4, and there reffeth 3, ye fhall fette the 8 betwyxte the two lynes, & the 3 aboue 5, then efface

the

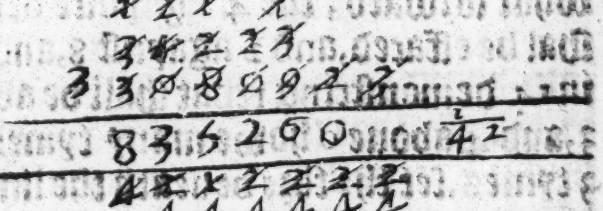
the 5 & the 4, then we shal set 4 vnder 0 and saye: in 30 howe manye tymes 4, 7 tymes, set 7 betwene the lynes at the ryght syde by the 8, and there resteth 2, whych we shall set aboue 0, and efface 0, then set 4 vnder 8 and say: in 28 how manye tymes 4, 7, and there resteth nothing, set 7 betwene the lynes by the 7, then set 4 vnder 0, and say: how many tymes 4 in 0, there is none, therefore set 0 betwene the lynes, then shall we saye: in 9 howe manye tymes 4, 2. tymes, set than 2. betwene the lynes, and resteth 1. which we shal set aboue 9 and efface 9, then say: in 12. how manye tymes 4, 3 tymes, set than 3 betwene the lynes by 2, and ther resteth nothing Than in 3 which is the last figure, how many tymes 4, no times, therefore at the ende of the figure ye shall set the. 3. thus, $\frac{3}{4}$ and all is done.

An Example.

			3	2		1				
A	3	5	0	8	0	9	2	3		3
C				8	7	7	0	2	3	40
B				4	0	0	0	0	0	0
					4	4	4	4	4	

Example, when the deuisor is an article, it behoueth to do semblably, in taking: As 3. how many tymes 4, no tymes, and therfore we shal set 4 vnder 5, and 0 vnder 0, & say: how many tymes 4 is in 35, 8. times, set 8. betwene the twoo lines vnder 5. and there resteth 3 which ye shall set ouer 5. Then set the 3. that stãdeth ouer 5, and the 0 together: and that is 30, than say how many times 4 in 30, 7. and alwayes so to the end. And then we shal set 4 vnder 2, and 0 vnder 3. and say: in 12 in taking the 1 that shall rest of the summe before, and shal be aboue 9, and the, 2. that is after 9, howe many tymes 4. 3 tymes 4, and then set 3 in the number of C. agaynst 2, & then shall we cease, for there remayneth all onely

onely 3 to be parted by 40, now ye shall not make 0 vnder 3. as is afore, but at the ende ye shall set 3. thus $\frac{3}{40}$



Example, when the diuisor is compost, as in this figure afore, ye shal say: in 35 that be neare A. how many times 4 that are in the nũber of B. 8 times 4 set that 8 betwene the two lines in the place of C, and ther resteth 3, which we shall set aboue 5. and efface. 35. of A. and 4 of B, then shal we say in multiplying the 8. of C. by the seconde figure of B. that is 2, we shall saye 2. times 8. be 16, thẽ abate 16. of the nuũber of A. against the same 42, and there be 3. which is ouer 5 of 0 of the nũber, that be worth 30

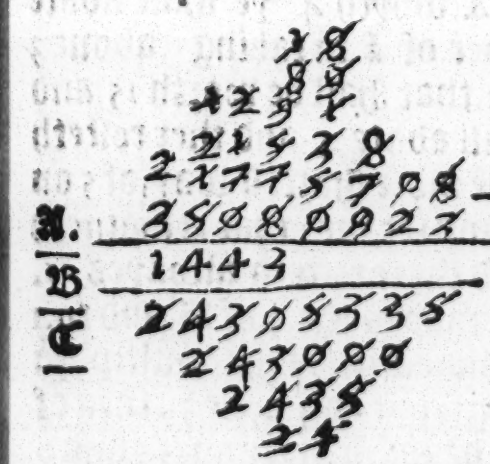
and

and we shal say: of 30 abate 16 and ther resteth 14, of the whych 14 we shall set 2 ouer 3 and efface 3, and 4 aboue 0 and efface 6, thē shal we set the deuisor some what forward, the 4 agaynste 0. that shal be effaced, and 2 agaynst 8, and say in 14 demonstring 1 that shall be aboue 3, and 4 aboue 0 howe many tymes 4, 3 tymes, set the thre beneath the line in the number of C. and there resteth two which wee shall set ouer 4, and efface 4. Then shall we say agayne in multiplying the 3 of C. by the seconde figure of B. which is 2, we shall saye than: 2. tymes 3 is 6, & of the 8 which is against it we shal abate 6, and ther shall rest 2 whych we shall set ouer 8 and efface 8, and alwayes so vnto the end. And whē we come to the twoo last figures of A. and that we woulde deuide them by 42, we may not, for the fyrst that is but 2 shal be effaced with 1 that standeth aboue 5, and because that we haue take there nothyng, we shall set 0 agaynst 2

of A.

of A. in the number of C. be twene the lynes, and so it is done, and there shall rest 3. to be deuided by 42, and that 3. shall be set at the ende of the partition, as thus $\frac{3}{42}$, and it is finished.

And it is to be knowen, that as many figures as foloweth the firste figure in the number of B. shall be multiplyed by them of the number of C. then the multiplication that thereof shall come, ye shall abate in the number of A. as in this example shal moze plainly appere.



The

The proofe.

In this example in the number of B. that is the diuisor, be manye figures, & therfore ye shal say: in 3. of A. howe many tymes 2. of B. 1 time, set that 1. vpon C. and 1 that remaineth of 3. ouer 3. and then shall ye come to the 4 of B. and to 1. of C. and multiplye them in saying: 1. tymes 4. is 4, whych 4 ye shall abate of the number of A. in taking 1. aboue 3 and 5 after 3. that shall be worth 15, and therof ye shall abate 4, and ther resteth 11, and for the more shortest way, of 5 only abate 4, and set the 1 that remaineth aboue 5, and there resteth alwayes 11. then shal ye come to the 3. of B. and to 1 of C. and make all onely the multiplication in saying: 1 tymes 3. bene 3, then of 10 abate 3 in demonstring 1. ouer 5 and 0

after

after, and then there resteth 7 which ye shal set ouer 0. thē because of the cipher 0 may nothyng come, ye shall leaue it, & go to the next figure and say: 1. tymes 5 that is at the last ende of B. bene 5, but in so much that we may nothyng abate of 0 that is against it in the number A, ye shall borowe of the figure afore, that is 8 onely one and efface the 8, and set the 7 aboue the 8, and the 1 that ye shal hold shall be worth 10. to the regard of the number that ye be in, then ye shall say: of 10 abate 5. there resteth 5, which ye shall set aboue 0, then shal ye auaūce our partiour consequentlye vnder the other figures following, that is to say, tyl the last of B be set vnder the last of A, and then ye maye not auaunce them any further, because ye be come to the endes of both the numbers.

The proofe of Diuision or Partition is made in thys maner: Ye shall fyrste make a Crosse, as ye dyd before in multiplication, and abate the 9. of the Partition

tition, and set the rest at the leaft ende of the Crosse semblablye of the thyrde number that is betwixt the two lynes, and set the rest at the right ende of the same Crosse, and if there bee nothyng rest, set a o. Then multiplye the twoo numbers of figures, for their be digets that one by that other, and therof abate all the 9. if there be nothing in the fyrste number, or if ye may not deuide it, ioyn it with the same that shall come therof. And so the rest that may not make 9 set it at the end vnder the Crosse. Then shall we come to the fyrst number, and semblably doo away the 9 therof, and set the rest aboue the Crosse, and if that aboue, and that beneath be like, the partition is good, or if it be not, it is false. And for to vnderstand it better, we will make proofes by the ensamples before sayde.

For the fyrst we shall take the parttour which is 4, and set it at the leafts syde of the Crosse, then shall we abate

the

the 9 of the thyrde number, and there resteth 8, which 8 ye shal set at the right ende of the crosse, and multiply it by 4, and thereof commeth 32, whereof resteth .5, then adioyne them wyth the 2 farthynges that we might not deuide, and they shall make 7, the whych 7 we shal set vnder the crosse, than shal we abate the 9 of the first number that bene the farthynges, and there shall rest 7, which 7 we shall set at the vpper ende of the Crosse, and so the twoo endes be both a lyke, whych sheweth the proofe, to be well and truly made.

The 4 proofe.

¶ The end of Partition.

¶ The

¶ The fyrst part called Reduction.

REduction is a kind of Algorisme, by the which ye be taught to reduce numbers of lesse denominatiõ or value, to nũbers of more denomination or valu, or if the case require it, numbers of great denomination to the numbers of lesse value. Example of the fyrst. 20. li. 63. s. 44. d. 10. far. Thus reduce farthinges to pence, & the pence to shillings, and the shillings to poundes, and then thys summe is. 23. li. 6. s. 10. d. and. 2. far. So haue you reduced the lesse summe to the more. Example to reduce the more to the lesse. Take the same example agayne, & reduce the. 20. li. 63. s. 44. d. 10. far. all into farthinges, and it wyll make. 22410. farthinges. Fyrste reducting the poundes to shyllynges, then to pence, and all that pence to farthinges. wherefore it shal be very necessary for you to know what thyng your number doth signify, whether weyght, money,

money, measure, or tyme, and to be expert in all maner of accomptes: it shall be necessary for you to know all maner of wayghtes, coynes, measures, & time. Exãple in English money, 4. farthings make a peny, 12. d. maketh a shilyng. 20 shillings maketh a pound.

In weyght, a fyrst of Troy weyght, euery pound hath. 12 ounces, and euery ounce. 20. peny weyght, and euery peny weyght. 20. graynes. &c.

The haberdepeyes pounde hath. 16. ounces, an ounce. 8. drammes, and the dramme. 3. Scruples, the Scruple. 20. graynes.

Of measure: the yarde hath. 3. foote, the foote hath. 12. ynches, the ynches. 3. barley cornes of length.

Of tyme, the yeare hath. 365 dayes, the day. 24. houres, the houre hath. 60. minutes, euerye minute. 60. secondes, euery second. 60. thyrdes, euerye thyrde 60 quartes, euery quart. 60. fiftes, euery fift. 60. syxtes, & so forth infinitelye.

¶ To reduce the moze summe to the lesse.

When thou wylt reduce the moze to the lesse, looke howe manye tymes the lesse is contayned in the moze, and by that number multiplye the number of the moze, and that that commeth of the multiplication, sheweth the moze reduced to the lesse. Example. I woulde reduce .8. pence to farthinges, looke howe many times a farthing is contayned in a penye, and that is as ye knowe foure times, then multiplye according to the rule 8. by .4. and that maketh .32. which be 32. farthings, and so .8. pence maketh 32. farthinges.

¶ An other example.

Here is a summe of .28. li. and .6. s. I would haue these poundes whych is of moze denomination reduced to the shyllinges, which be of lesse denomination: then looke fyrste howe ofte a shylyng is contayned in a pound, and that is .20. tymes, for .20. s. maketh a .li. mul

tiply

tiply then the .20. li. by .20. thereof commeth .560, whiche be all shillinges, to thys put the other 6. shillings, and so al is 566. shillinges.

But ye shall note, that where ther be any summe of meane denominations, betwene the moze to bee reduced, and the lesse, to whom reduction is made: then shall it be easier to reduce fyrst the moze to the meane, and so by the meane to the lesse.

The example .43. li. 19. s. 20. d. 4. farthinges, if ye wyll reduce al these sums to the farthinges, then shall it be better for you to reduce the poundes fyrste to shyllynges, and then beyng shyllynges to reduce them to pence, and at the last to farthinges: so by your rule .43. pound maketh. 860. shyllynges, to that adde the .19. shyllynges, it maketh. 879, then reduce thys. 879. shyllinges to pence: looke fyrst how many pence are contayned in a shillyng, and that is .12, multiply 879. by .12, & therof commeth. 10 548

which bee all pence, to thys adde your 20. pence, & that maketh. 10568. d. then reduce these pence to farthynges, see how manye farthynges bee in a penye, that is. 4. multiplye. 10568. by 4. commeth to. 42272. to these adde the. 4. farthinges, and that maketh. 42279. farthinges. Thus haue ye reduced. 43. li. 9 s. 20. d. 4. farthinges, the moze by the meane to the lesse.

¶ To reduce the lesse to the moze.

Fyrst marke howe manye tymes the moze doth contayne the lesse, and by that number deuide the lesse, and the quocient sheweth the lesse reduced to the moze. Example. I woulde haue this summe. 5600. s. reduced into poundes. for howe manye tymes a pounde doth contayne a shillyng, that is twenty times, then deuide. 5600. by twenty, the quocient shalbe. 280. which be poundes. so that. 5600. s. reduced to poundes maketh. 280. li. and so lykewyse in all other reckoninges.

When

When summes of diuers denominations come in addition to be added together, then beginning at the summes of least denomination, adde them euer together, tyll such tyme as they make a number of the next denomination, and that that remayneth not able to make any number of greater denomination, set it vnder the lyne, and proceede to the next summe of greater denomination, to the whyche adde the number of the same denomination reduced out of the summe before the lesse denomination, so proceeding to the ende.

An example.

li	s.	d.	far.
1680.	10.	5.	3.
8200.	29.	7	2.
2008.	3.	10.	3.

Begin at the least which be farthings saying: 3 and two bene 5, and 3. bene. 8. these. 8. farthings make. ii. pence, there-

fore take these pence, and adde them to the next summe, whyche is of the same denomination, saying: 2 and 10 be 12.d. which is one shilling, the 7 and 5 be. 12. which also maketh a shilling. so among these pence ye haue twoo shyllynges to be added to the next order of shillinges, saying: two and thre be. 5. and. 9. is. 14. put the diget 4. vnder the lyne, and reserue the article one to the nexte place, saying: 1 and 2. is 3. and 1. maketh. 4. set that 4. vnder the lyne also, and then is it. 44. s. the which reduced to poundes maketh. 2. li. and. 4. s. remaineth vnder the title of shylinges: then put to that 2. li. to the other poundes, and so haste thou done in reduction of the summes of lesse value to the greatest summe which be poundes. And thys is sufficiently entreated of Reduction.

¶ The ende of Reduction.

¶ The

¶ The leuenth part called Progression.

PRogression sheweth the number when it beginneth at .1. or at 2, in mounting alwayes by one & one as doth thys number 123456789. Now if ye will know the valour of the numbers, fyrste ye muste regarde twoo thinges, that is to wytte, if the number procede continually without leauing any thing betwixt as here 123456789, or if it leaue any thing betwixt as here 13579 Secondly, ye must consider if the number be euen or od. And after these twoo considerations, then by foure rules that here folowth ye may know the valour of eche whole number.

The fyrst rule is whan one number procedeth in mounting alwayes continuallye in the beginning, then if it ende in an euen number, then shall wee take the halfe of that euen number, and by it we shall multiplye the odde number that commeth of the euen number, as ye may see in thys example folowing.

¶ An example.

1 2 3 4 5 6 7 8

4

9

36

If ye wyll knowe how muche thys number is wooꝛth, thã multiply the half of 8 that is 4, and the number that is after 8 is 9, and then thereof commeth 36, and so much is the summe wooꝛth. And thus maye ye doo wyth all such lyke questions.

¶ An other example.

1 2 3 4 5 6 7

4

7

28

Foꝛ to multiply thys number 7. wher in the greatest and the moꝛe halfe is 4. ye must multiplye 7. by 4. and it is 28, and so much is the whole summe.

The thirde is, if a number proceede not

not continuallye, and ende in an euen number, ye shall take the halfe of the sayde number that is euen, and by him multiplye the same that is nexte commyng after the same halfe, and in this doing ye shall haue the summe of the same number.

¶ In example.

2 4 6 8

4

5

20

The

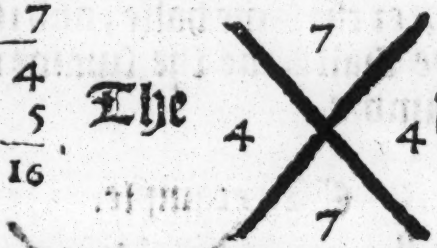
prose

If ye wyll knowe howe muche thys number is woorth, then take the halfe of 8, that is 4. then multiplye by the 4. the number whych followeth, that is 5. in saying: 4 times 5. is 20. and so muche is worth the whole summe.

The fourth is whan the sayde number proceedeth not continuallye, then if it ende in an odde number, ye shal take the

the halfe of the sayde number that is odde, and multiply it by it selfe.

An other example.



If ye wyll knowe howe muche thys number is woorth, then take the greater halfe part of 7, which 7. is the odde number, and the greater is 4, then multiply the same 4. by himselfe in saying: 4 times 4 is 16, and so much is woorth the sayd number. And thus maye ye do with any other such lyke questions.

Yet is there an other progression, and it is also a maner of duplicatiõ, as here after shall appeare.

1 2 4 8 16 32

Now if ye desyre to make a summe of these, do nothing els but double the last

last figures, as 32 and 32 is 64, and ther of subtragh 1, and there resteth 63, and that is the summe, and it is done.

¶ The end of Progression.

¶ The rules of Fractions.

IN Fractions there be twoo maner of numbers, wherof the fyrst is called the Numerator, for hee sheweth the number of the denominator, that standeth vnder him. The other is called the Denominator, for he sheweth euer howe muche the part is, and standeth euer vnder the Numerator, and ye may make betwene them both a lyne if it please you, as appeareth in these examples following.

Seuen by 9. parted, ye shall set thus $\frac{7}{9}$

And 1 by 2 parted thus, $\frac{1}{2}$

And 1 by 4 parted thus, $\frac{1}{4}$

Of Fractions.

Of numeration.

Numeration is the firste espeche, and it is nothing els but that ye must euer set the lesse summe aboue, and the moze summe vnderneath as by these examples followyng is shewed.

$\frac{1}{2}$ $\frac{1}{5}$ $\frac{1}{9}$ $\frac{2}{3}$ $\frac{6}{7}$ $\frac{8}{10}$ $\frac{3}{4}$ $\frac{4}{6}$ $\frac{5}{9}$ $\frac{6}{8}$ $\frac{8}{14}$

Of Addition.

If ye wyll adde twoo oz three, oz foure broken numbers together, ye must marke whether the numbers be of one denomination, as these $\frac{1}{3}$ and $\frac{2}{3}$ yf they be al of one name, then adde them together in saying: 1. and 2. is 3. set the 3. aboue 3, & that is 1. whole. Now adde $\frac{2}{5}$ $\frac{4}{5}$ and $\frac{3}{5}$ together, and set them thus $\frac{9}{5}$ they make 1 and $\frac{4}{5}$.

Now wyll ye adde broken and vneuē num

numbers as $\frac{2}{3}$ to $\frac{3}{4}$ thē to multiply them crosse wyse and say: 3 tymes 3 is 9, and 2. tymes 4 is 8, adde that .8. to .9. and it is .17, then multiply the numbers together in saying: 3. tymes 4 is .12, set that 12 vnder 17, as thus $\frac{17}{12}$ that is 1 and $\frac{5}{12}$

When there cōmeth moze broken nūbers then two at once, as in this example, if you woulde adde $\frac{5}{4}$ $\frac{5}{6}$ to $\frac{4}{5}$ then make the .2 first numbers after the rule afoze sayd, & it cōmeth to $\frac{14}{24}$. Nowe ad $\frac{38}{24}$ to $\frac{4}{5}$ and multiplye them crossewyse, in saying 5 times 38 is 190, thē 4 times 24 is 96, thereto adde 190 commeth to 286, set them aboue the lyne, then multiply 5 with 24, commeth 120, set them vnder the lyne, and they stand thus $\frac{286}{120}$ that is 2 and $\frac{4}{120}$. Now adde me $\frac{1}{2}$ and $\frac{3}{5}$ to $\frac{4}{7}$ then say: 2 times 3 is 6, & 5 tymes 1 is 5

is 5. adde them together, for the tellers, and set it aboue the lyne, then multiply the two numbers together, in saying: 2 times 5. is 10, set that 10 vnder. 11. as thus $\frac{11}{10}$. Nowe adde $\frac{11}{10}$ to $\frac{4}{7}$ multiplye them crosse wyse, lyke as ye dyd in the example before. and ye shall haue $\frac{117}{70}$ which is 1 and $\frac{74}{76}$ and thus ye shall doo with all other.

Of Subtraction.

WIll you subtragh a broken from broken, then ye muste marke whether the numbers of the same broken be lyke in denomination, or not, and if they be like of name, then euer subtragh the lesse teller out of the more, and set the number vnder the teller. As for example, if ye wyll subtragh $\frac{5}{12}$ from $\frac{7}{12}$ then subtragh the vppermost 5 out of 7, and there resteth .2. set that .2. aboue

aboue 12 as thus, $\frac{2}{12}$ that is $\frac{1}{6}$, but when there cõmeth broken & vneuen nũbers, as these $\frac{9}{13}$ from $\frac{5}{9}$, then multiplye both the nũbers together in saying, 6. tymes 13. is 78. Then multiply crosse wyse the numbers with the tellers, in saying: 13. times 5. is 65 from 9 times 9 is 54, now subtract 54 from. 65. and there resteth 11. that 11. set aboue 78, as thus $\frac{11}{78}$. Now wyll ye subtragh $\frac{13}{34}$ from $\frac{24}{65}$ breake eth together, and commeth to $\frac{13}{12}$ and $\frac{22}{15}$ then multiply the number in saying 15 times 12. is 180, then multiply them cros wise in saying. 12. times. 22. commeth to 264. then say: 15. times. 13. commeth 95. now subtragh this 195 frõ 264, & ther resteth 69, which 69 set aboue 180, as thus $\frac{69}{180}$ and it is Done.

$\frac{2}{6}$ frõ $\frac{1}{0}$ is $\frac{6}{36}$ $\frac{1}{3}$ frõ $\frac{1}{4}$ is $\frac{1}{12}$

Of

If ye wyll multiplye $7\frac{6}{13}$ with 16 then multiplye the vppermost fygures together in saying: 6 times 13 is 78, thē multiply the neather most together, in saying: 7 tymes 16 is 118. the whiche ye shal set thus $87\frac{12}{56}$ that is $30\frac{2}{5}$. Now wil ye multiply broken wyth the whole: as $6\frac{1}{2}$ wyth 5 then say: 2 tymes 6. is .12. and 5. times 1 is 5, set them thus $\frac{12}{5}$. And whē that the vppermost number is moze thē the neathermost, then ye shall deuide it with the neathermost, & that that commeth thereof is the whole, as thus: deuide 2. with 5, commeth 2 hole & 2. Now will ye multiply the whole and $5\frac{4}{5}$ broke wt the broken, as $7\frac{5}{8}$ wt $5\frac{8}{13}$ thē multiply them wyth) 7, cōmeth 28, & ad 3 therto, commeth $4\frac{3}{4}$ Now make it after the first rule in saying: 5 tymes 31. is 155 & 4 tymes 8 is 32, set them thus $155\frac{27}{32}$ that maketh $4\frac{27}{34}$ and it is done.

1 and 1 is 1 2 and 6 is 12
3 4 12 3 6 24

Of Division.

The number that ye wyl deuide set either at the left hand, or that ye wil deuide wyth all, set at the right hande. As when ye wyl deuide 4 wyth 2/3. And ye shall multiply the broken crosse wise in saying: 3 times 4 is 12, & is the whol that ye will deuide, then multiply 3 & 2 commeth 10, that is 12/10 maketh 1 2/10. And when that ye wil deuide broken wyth whole, as 7 wyth 1/4, then set your fraction and whole thus 7/1 4, nowe multiply 1 with 3, that is the whole whyche must be deuided, then multiply 4 with 7, and it maketh 28, which must be set thus 3/28 and it is done. But if ye may deuide the tellet iust with the whole, that were lyghter, as 18/3 in 6 whole, therfore

deuide 18 is 6 maketh 3. the whyche ye shall set thus $\frac{3}{19}$. Nowe wyll ye knowe what broken of broken is, as $\frac{2}{3}$ of $\frac{3}{4}$

Fyrst ye shal multiply the vppermost figures one with an other saying: two tymes. 3. is 6. and then the vppermoste in saying: 3. times. 4. is 12. that maketh $\frac{6}{12}$ that is $\frac{1}{2}$. Item $\frac{6}{7}$ of 128 $\frac{2}{3}$ multiplye 128. with. 3. and adde there 2, commeth 386. whych set thus, $\frac{386}{3}$ then multiplye them wyth 6. commeth to. 2316, then multiplye the vndermoste altogether, saying: 3 tymes 7. is 21. and 2. tymes 21. is. 42, therewyth deuide 2316. and it is done.

¶ The ende of the rule of Fractions.

¶ A Table very necessarye for Multiplication.

1	times	1 maketh 1.	3	8	24
2		2 4	3	9	27
3		3 9	3	10	30
4		4 16	4	times	5 make. 20
5		5 25	4	6	24
6		6 36	4	7	28
7		7 49	4	8	32
8		8 64	4	9	36
9		9 81	4	10	40
10		10 100	5	time	6. makes 30
2	times	3 makes. 6.	5	7	35
2	4	8	5	8	40
2	5	10	5	9	45
2	6	12	5	10	50
2	7	14	6	times	7 make 42
2	8	16	6	8	48
2	9	18	6	9	54
2	10	20	6	10	60
3	times	4 make. 12.	7	time	8 makes. 56
3	5	15	7	9	63
3	6	18	7	10	70
3	7	21	8	time	9 makes 72

8 10 80
9 times 10 mak. 90
10 times 11 makes. 110
2 11 22
3 33
4 44
5 55
6 66
7 11 77
8 88
9 99
10 110
11 times 12 make. 132
2 2 24
3 36
4 48
5 60
6 12 72
7 84
8 96
9 107
10 120
1 time 13 maketh 13
2 26
3 39
4 52
5 65
6 13 78
7 91
8 104
9 117
10 130
1 time 14 makes 14
2 28
3 42
4 56
5 75
6 14 84
7 90
8 112
9 120
10 140
1 time 15 maketh 15
2 30
3 45
4 60
5 75
6 15 90

7		105		7		119	
8		120		8		136	
9		135		9		153	
10		250		10		170	
1 time	16	maketh	16	1 time	18	maketh	18
2		32		2		36	
3		48		3		54	
4		64		4		72	
5		80		5		90	
6	16	96		6	18	108	
7		112		7		126	
8		128		8		144	
9		144		9		192	
10		160		10		180	
1 time	17	makes	17	1 time	19	maketh	19
2		34		2		38	
3		51		3		57	
4		68		4		76	
5		85		5		95	
6	17	102		6	19	114	

7		133	7		154
8		152	8		176
9		171	9		198
10		190	10		230
1 time 21 makes		21	1 time 23 maketh		23
2		42	2		46
3		63	3		69
4		84	4		92
5		105	5		115
6	21	126	6	23	138
7		147	7		161
8		168	8		194
9		189	9		207
10		210	10		230
1 time 22 makes		22	1 time 24 make		24
2		44	2		48
3		68	3		72
4		88	4		96
5		110	5		120
6	22	132	6	24	144

7		168
8		192
9		216
10		270
1 time	25	maketh 25
2		50
3		75
4		100
5		125
6	25	156
7		275
8		200
9		225
10		250
1 time	26.	makes. 26
2		52
3		78
4		104
5		130
6	26	156
7		182
8		208
9		234
10		260
1 time	27	makes 27.
2		54
3		81
4		108
5		135
6	27	162
7		189
8		216
9		245
10		270
1 tyme	28	makes 28
2		56
3		84
4		112
5		140
6	28	168
7		196
8		224
9		252
10		280
1 time	29	makes 29
2		58
3		87
4		116
5		174
6	29	145
7		203
8		232
9		261
10		290
1. time	31.	makes. 31.
2		62
3		93
4		124

		15
	31	186
		217
		248
		279
		310
1 time	32. maketh	32
2		64
3		96
4		128
5		160
6	32	192
7		224
8		256
9		288
10		320
1 time	33. maketh	33
2		66
3		99
4		132
5		165
6	33	198
7		231
8		264
9		297
10		330
1 time	34 makes	34
2		68
3		102
4		136
5		170
6	34	204
7		238
8		272
9		306
10		340
1 tyme	35 makes	35
2		70
3		105
4		140
5		175
6	35	210
7		245
8		280
9		315
10		350
1 time	36 makes	36
2		72
3		108
4		144
5	36	180
6		216
7		252
8	36	288
9		324
10		360
1 time.	37. make.	37
2		74

3		111
4		148
5	37	185
6		222
7		259
8	37	296
9		333
10		370
1 time	38.	make 38.
2		76
3		114
4		152
5	38	190
6		228
7		266
8	38	304
9		342
10		380
1. time	39.	make 39
2		78
3		117
4		156
5	39	195
6		234
7		275
8	39	312
9		351
10		390
11 time	11.	makes. 11

12	12	144
13	13	169
14	14	195
15	15	225
16	16	256
17	17	289
18	18	324
19	19	361
21 time	21.	mak. 441
22	22	484
23	23	529
24	24	576
25	25	623
26	26	676
27	27	729
28	28	784
29	29	841
31 times	31	mak 961
32	32	1024
33	33	1089
34	34	1156
35	35	1225
36	36	1296
37	37	1369
38	38	1444
39	39	1521
41 time	41	ma 1681
42	42	1764
43	43	1849

44	44	1936
45	45	2205
46	46	2116
47	47	2209
48	48	2304
49	49	2401
50 time	50 ma.	2501
51	51	2601
52	52	2704
53	53	2809
54	54	2916
55	55	3025
56	56	3136
57	57	3249
58	58	3364
59	59	3481
60 times	60	3721
61	61	3844
62	62	3969
63	63	4096
64	64	4225
65	65	4356
66	66	4489
67	67	4624
68	68	4761
69	69	4900
70 times	70	5041
71	71	5184
72	72	5329
73	73	5476
74	74	5625
75	75	5776
76	76	5929
77	77	6084
78	78	6241
79	79	6401
80 time	80	6561
81	81	6724
82	82	6889
83	83	7056
84	84	7225
85	85	7396
86	86	7569
87	87	7744
88	88	7921
89	89	8281
90 time	90	8464
91	91	8649
92	92	8836
93	93	9025
94	94	9216
95	95	9409
96	96	9604
97	97	9801
98	98	
99	99	

¶ The end of the table.

Here foldweth the Rules

and fyrst the rule of three

Multiply by the contrary, & deuide by the semblaunt or lyke. Thys rule may be vnderstand in twoo maners. Fyrst multiplye the same that ye wyll bye by his contrarye, that is to wyt by the pryce, & deuide by the semblant, that is to wit, by as muche as ye haue bought, or thus: Multiplye the price by hys contrarye, that is to wyt, by the same that thou wylt bye, and deuide it by hys semblaunt, that is that same that ye haue bought. And note ye why it is called the rule of thre, for with three numbers certayne ye maye know and fynde the fourthe number vncertayne. And it is a rule ryghte notable and necessarye in the feate of marchaundise. For to haue knowledge of thys rule, it behoueth to set some rules different in maner of questions, and first in measures long.

¶ The rule of whole numbers.

If 9. elles of clothe cost. 25. crownes, how

how much shal cost 15 by the price? Answer. It behoueth you to set the sum, that is to wyt. 25. crownes. And than ye shall multiply by hys contrarye, that is to wyt, by 15. that is. 375, & thē deuide them by that semblant, that is to wyt, by. 9. and thereof cōmeth 41 crownes & an halfe, and there remayneth 1 crown and an halfe, the which ye shal make in S. and ther be. 54. S. the which ye shal deuide by nine, and therof commeth. 6. S. Therefore ye may answer that the. xv. elles shall cost. 41. crownes and an half and. 6. S. Now if ye wil make the proue, it behoueth you to forme your question thus: If. 15. elles cost. 41. crownes and an halfe and 6. shillinges, howe muche shal cost. 9. elles by the price. Then it behoueth you fyrst to multiply the. 6. S. by 9. and that is 54. then it behoueth you to make thereof crownes, that is one crowne and an halfe, and then ye shall multiply the. 41. crownes and an halfe by 9. and they ben 373 crownes and an

halfe,

halfe, and then set therto 1. crowne and an halfe, & they be 375. crownes, whych ye shall deuide by. 15. that bene. 25. the which. 25, is the price of. 9. elles, and so the rule is good. And thus you ye maye do with al other lykewyse.

¶ The seconde rule of whole number, wyth numbers broken semblable.

If. 1. els and. 2. third partes of clothe cost. 35. franc, howe muche shall cost. 14 elles by the price. Answer. For to knowe this rule and other semblable, it behoueth you to reduce the els bought, and them that ye wyll bye all into thirdes, because of them that be bought, in saying thus: 3 tymes. 10 is. 30, and set therto. 2. thirdes, that is than. 32. thyrdes. Then it behoueth you to make deuision by. 32. and than ye shal reduce the 14 els into one third, in saying thre times 14 is 42. Then 42. shall be the multiplicatour. Now set the sum, that is to

wyt

wyt 35 franc, the whych multiplied by 42, be 1470, the whiche diuided by. 32. thereof, commeth to 45. frãc. & an halfe, and there resteth 14. franc. the which ye shal reduce to shyllinges, & then deuide them by 32, & therof commeth 8. s. & an halfe, and then shall ye make them in pence, and deuide them by 32, and therof commeth 3. pence, therefore ye maye answer that the. 14. elles of clothe shall cost. 45. francz and an halfe, 8 shillinges and an halfe and 3. pence.

For to make the proofe, it behoueth you to make your worke by the contrarye, for it behoueth you to multiplye the summe that the 14 elles cost by the deuisor, and deuide it by the multiplicatour. Therefore let the summe vpon the leaft syde, and fyrst multiply the 3. d by. 32, and when they be multiplied, ye shall make of them shillinges, and then ye shall multiply the. 8. s. and the halfe by. 32. and then make thereof francz. And then ye shall multiplye the. 45.

francz

trancz, and the halfe by. 32. and deuide them by 42. and so ye shall know if the rule be well made.

¶ The third rule of whole nũbers with diuers minutes.

If 4 elles and 2, thyrdes of cloth cost 10 crownes, how much shall cost 6 elles 3. 2. quarters by the pryce. For to know this rule, it behoueth you fyrste to reduce the 4. elles and 2. thyrdes thus: 3. tymes 4 is 12. And then ye shall adioyn the 2 thyrdes, and than it is. 14 and the the elles that ye wyl bye, ye shal reduce them into one fourth thus: 4 tymes 6 is. 24. And then set the 2 quarters therto, and than there is. 26. quarters. And than ye shall multiply that one by that other, that is to wyt the numbrant of the fyrste by the denominant of the second, in saying: 4. tymes 14. is 56. And that 56 shall be the deuisor. Then multiply the numbrant of the second, by the

deno-

denominant of the fyrst, in saying: three tymes .26. is .78. and that .78. shalbe the multiplicatour. And therefore set tenne crownes and multiply them by .78. and deuide them by .57. and ye shall fynde that the .6. elles and .2. quarters cost .13. crownes and an halfe .15. shillings and 5 pence. And there resteth .8.

¶ The example.

Deuisor.		M.	
59	142	142	78
10 crones	240	2	
	3	4	

If 4 elles $\frac{2}{3}$ cost .10. crownes, 6. elles $\frac{3}{4}$ shall cost .13. crownes and an halfe .15. shillinges .5. pence, there resteth .8.

For to make the proofe, it behoueth you to worke the contrarye, you muste multiply the sum by the diuisor, that is to wyt, by 59. and make diuision by the multiplicatour, that is to wyt by .78. & ye shall fynde .10. otherwyse if there be moze or lesse, the rules be false.

¶ The

¶ The fourth rule containing whole numbers to the marchaundike, that ye haue bought, & minutes to the same that ye wyl bye.

If 8 els of cloth cost 15 crownes, how much shall cost 2. quarters by the price? For to know this rule, ye must reduce the 8 elles into quarters, in saying: 4 tymes 8 is 32, then 32 shall be the deuisor, and the 2 quarters shall be the multiplicator. Now set the 15 crownes and multiplye them by 2 quarters, and deuide by 32, & ye shal finde that the two quarters cost 10 crownes, and the halfe 3 shillinges and an halfe 3. pence. For to make the proofe ye must worke the contrary, for ye shal multiplye the sum that the 2 quarters cost, that is 10 wyt crownes, & the halfe 15. s. and an half 3 pence by 32, and deuide them by 2.

¶ The rule of round measures that is to wyt, measure of corne, of wyne, and of oyle.

First it behoueth you to presuppose and know the measures of corne.

One muy is worth 12 septiers.
One septier is woorth 4 minotes.
One minot is woorth 3 bushels.
One bushel is worth 4 quarters.

¶ The measures of wyne.

One muy of wyne holdeth 36 septiers.
The septier holdeth 4 quartes.
The quart holdeth 2 pintes.
The pinte holdeth 2 choppines.
The choppine 2 halfe septiers.
The halfe septier 2 posiions.

¶ The first rule.

If the muy of corne cost 10 frances, how much is worth the bushell? Answer. For to knowe thys rule, ye must know howe many bushels is in 1. muy. Therefore multiply the muy by 12, and than by 4, and than by 3, whyche commeth to 144 bushels, the whiche shall be the deuisor of 10 francs, therefore deuide 10 by 144. And thereof commeth 1. s. 4. d. and an halfe, resteth 24 pence.

Ther

Therefore the bushell costeth 1.s. 4. d. and an halfe, reketh 24. d.

¶ The second rule.

To the contrary, if the bushel cost one s. how much shal cost a thousande and 4 hundreth muys by the price. Answer for to know thys rule, it behoueth you to make all the muys in bushels. And there be 201600 bushels, the whiche it behoueth you to multiplye by two, and there bee 403200, and of them ye shall make crownes. Therfore deuide by 36 and there bene 1200 crownes. Therefore ye may answer, that if the bushell cost two. s. a thousand and 4 hundreth muyes shall cost a leuen thousande and twoo hundreth crownes, and thus ye may do of all other semblable.

¶ The third rule.

If the septier of corne be worth 1 frā. & the loafe of penye tourneys wayght 12 ounces, how much ought it to weyghe when the septier is worth 15 tourneys.

Answer. Multipli the first number by the

second, that is to wit. 10. by. 12. and deuide it by. 15. and ye shall fynde that it ought to weygh 16. ounces. And thus ye may do of all other lybe.

If the muy of wyne be worth. 12. frances, howe muche ought the pynte to be worth. Aunswer. For to knowe thys question, it behoueth you to reduce the 12. muys into septiers, from septiers in to quartes, and frō quartes into pints, and they be 288. pintes. And than ye shal reduce the. 12. frances into shillings that is 240, and that into pence, that bene. 2880. pence, the whiche behoueth you to deuide by 288, and it commeth to. 10. d. Therefore if the muy of wyne cost 12. francz, the pynte is worth. 10. d But it is requisite that the Tauerner haue some gaines. If he sel 12 pence the pinte, I demaunde howe much shall he win vpon the muy. Aunswer. He selleth it 2 d. more then it is worth, therefore multiply 288 pintes by 2, and they bee 576, the whyche ye maye deuide by. 12.

and

and there shalbe 48.s. Therefore maye ye aunswer that he getteth 48.s. vpon the muy.

If the muy cost 10 francz, how much is worth the pynte. Aunswer. It behoueth you to doo as is aboue sayde, and ye shall finde that it is worth. 8. pence, and one third.

If the pynte cost 6. pence, how much shall cost 12. muys by the pryce. Answer It behoueth you to know how manye pintes be in a muy, that is. 288., multiply 12 muys by 288, that is 3456 pints. And than multiplye the pyntes by 6. that is 20736, of which summe ye shall make. s. by deuision, and there be 1072 8. and of shillinges ye shal make francz. Therefore ye shall make diuision by 26 ye shall fynde 86 francz. 8. s. Therefore ye may aunswer that the. 12. muys shal cost. 86. francz. 8. s.

¶ In so muche as competentlye wee haue treated of the rule of three in the fayct of measures, it is ex-

pedient that we treate thereof in the fayct of weyght

If an hundreth pound of pepper coſt 20 shillings, how much shal coſt 6 pound by the price? Answer. For to know thys question, ye muſt multiplye by the contrary, and deuide by the semblant, that is to wyt multiply by 6, and deuide by 100, and ye shal finde that the 6 pounde shal coſt one frances and 4 s. To make the proofe ye muſt multiply by 100, and deuide by 6. Now I demaund if the 6 pound coſt one frances 4 s. how muche is wooꝛth the ounce? For to know thys ye shal make the pounds in onnces, the which bene 96 ounces, and then make the money in pence, the whych are 288 pence, the whiche ye shall deuide by 96, and thereof commeth 3 pence, therefoꝛe the ounce shall coſt 3 pence.

If one pound of saffron coſt 3 frances and an halfe, how much is wooꝛth the ounce? Answer. It behoueth you to knowe that in a pounde is 16 ounces,

ther-

therefore deuide the 3 frances & the half by 16, and ye shall finde that the ounce is worth 4 shillings 4 pence & an half, and thus ye may do of other lyke.

If 4 pound of saffron cost 16 frances 6 s. 8 d, how much shal cost 3 quarterns by the price? For to knowe this rule, ye shall reduce the 4 pound into thirdes, & shal say: 3 times 4 is 12, and 1 third bene 14, then ye shall multiply by 4, and shal say: 4 times 14 bene 56 the diuisor, then for the second number we shal say: thre times 3 is 9 fourthes or quarters, the which 9 shal be the multiplier: Now set the 16 frances 6 s, 8 d, torneys, and multiply them by 6 and deuide them by 16, and thereof commeth two frances & an half two shillings 6 d: Therefore ye may answer that the 3 quarterns shall cost two fr & an halfe, 2 s, 6 d: For to make the proofe, ye must worke by the contrary in multiplying by the diuisor, that is to wyt by 56, and make diuision by 9, & so may ye do of other semblable.

If one pounde of tyn coste 9 blances, how many hundreth shall I haue for a thousand and 4 hundreth francz. It behoueth you to knowe howe muche is worth the hundreth by 9 blances the pound. And ye shall finde that there is 12 franc. and an halfe. Now make diuision of 1400 frances by 12 frances and an halfe, ye shall finde 112. Therefore ye may say that I shall haue 112 pound of tynne for 1400 frances. And also as ye haue made this rule, ye may doo in all other marchandises, as in leade, yron, spices, pepper, & suger. And as ye haue done of poundes, ye maye doo of quarterns, ounces, and all other weyghtes.

A rule without tyme.

Three Marchauntes put their money together for to haue gaines, the whyche haue bought suche marchaundise as hath cost 125 franc. whereof the first hath layd 15 francz. The seconde 45. and the thirde 365. And they haue

gotten

gotten 54 franc of cleare gaynes. I demaund how shall they deuide it, so that eche man haue gaines according to the money that he had layde downe. Answer. In all suche rules and questions ye shall multiply eche one after the money that he had layd, therfore multiply the gaynes for the fyrst by 25, & deuide by 125 that is the diuisor common. For the second multiply the gaynes by 64, and deuide by 125 the diuisor common. And for the thyrd multiply the gaynes by 36, and deuide by 125 the diuisor common. And for to fynde the deuisor common, ye shall set together the multiplicatours, that is to wyt. 25. 64, and. 36. which is 125 the diuisor common. And so shall ye doo in all rules of company. Now ye may fynde & know how much eche one hath of gaines, and ye may see it by the example here present.

The first hath 10 fz and halfe 2. s. The seconde hath 27 frances and halfe 2. s. and halfe 5. d. and halfe, resteth 2. d. and

halfe.

halfe. The third hath 5 frances and an halfe 5.s resteth 60 pence.

256436 125.

Multiplicatours. Diuisor.

And they haue yet to bee deuided among them of restes 62.d, and an halfe.

For to make the proffe it behoueth you to deuide the restes, and then reduce al togethers, and ye shal finde the sum deuided, for all the rules of company bene proued by addition of summes.

¶ The second rule of Whole tyme.

IF Oure Marchauntes layd money together for wynnyng for a certayn time, of whom the first hath layd 10 fr for two yere. The second 20 fr for 3 yeare. The third 100 frãces for one yeare: And the fourth hath laid 40 frãc. for 4 yeare, and thye haue gayned 454 frances, I demaund how much ech one ought to haue of winning after the money that hee hath layde, and after the tyme

tyme that hee hath holden hys money in gayne for company. Answer. For to know this rule and other semblable, ye shal multiplye the money that eche one hath layd by the tyme that he hath holden it in company. Example. The fyrst hath layd 10 frances for two yeare, therefore it behoueth you to multiplye 10 by 2 in saying: 2 times 10 is 20. For the second, 3 times 20 is 60. For the third one tyme 100 is an 100. For the fourth 4 tymes 40 is 160, and then it behoueth you to finde a diuisor common, for eche hath hys multiplicator, that is to wyt, the same that he hath layde, and for to finde it ye shall set together al the multiplicatours, that is to wyt, the 20, 60, 100, 160 the which maketh 340, therefore these 340 shal be the diuisor common to all, then howe muche eche one ought to haue ye may see by the example here folowing. 454. S.

The first hath 26 frances and halfe 4 S. one peny, resteth 140. D.

The

The second hath .80. frances .2.s. 4.d rest .80. pence.

The thyrde hath .134. frances .1.s. 5. pence, rest .20. pence.

The fourth hath .213. franc, & an halfe 2.s. and a halfe .5.d. rest .100. pence.

20. 60. 100. 60. 340.

Multiplicateurs. Diuisor.

Of rest they haue to deuide one penye.

¶ The rule of company, Wher as is whole tyme, and partes of tyme.

THree Marchauntes laye money in compauye for to haue gaynes therby, of whom the fyrst hath layd 30 frances for two yeares. The seconde hath laid 40. frances for one yeare and three monethes. And the third hath layde 60 frances for three yeares and twoo monethes. And they haue gayned wyth this money 44. frances. I demaunde how they shal deuide it, to the end that ech one haue his right after the money

and

and the tyme that they haue set and holden for to gayne. Aunswere. For thys rule & all other semblable, ye shall multipiye the tyme by the money, as wee haue sayd aboue. But for as muche as there be monethes, ye must set and reduce all the tyme of eche one in monethes, and also if there were any dayes, ye should set al the time in dayes. The first hath layd 30. frances for 2. yeares. in 2. yeares is 24 monethes, therefore multiply 30 by 24, there bene 720. and this 720 shall be the multiplicatour of the first. The second hath laid 40 frantes for 1 yeare and 3 monethes, in one yeare bene 12 monethes, and three doth make 15 monethes, multipiye 40 by 15, they make 600. whiche is the multiplicatour of the seconde. The thyrde hath layd 60 franc. for 3 yeares and two monethes, in 3 yeares is 36 monethes. &. 2. maketh 38 monethes. Now multipiye 60 by 38, and they bee 2280, which shall be the multiplicator of the thyrd. Now

for

for to haue a deuisor common, ye shall set together al the multiplicatours, that is 3600. the diuisor common. They haue to deuide 44 frances. The fyrste hath 8 frances, and half 6.s. rest 0. The second hath 7 frances. 6.s. and halfe, rest 0. The thyrde hath 17 frances and halfe 7.s. 4 pence, rest 0.

720.600.2280. 3600.
Multiplicatours. Diuisor.

A rule of diuers syluer and diuers tyme.

THree Marchaunts haue made compayne together, of whom the fyrste hath layde 10 frances, 4 shyllynges for two monethes. The second hath layde 15 frances for one yeare. And the thyrde hath layd 6 fran. 7.s. for 8 monethes, & they haue gotten of this money 24 frã. How they shal deuide it after the money & after thys time I demaund. Answer. For to know thys rule and all other semblable, it behoueth you to re-

duce the money of euery man into shillinges. And all the tyme in monethes. And then multiplye the money by the tyme. Example. The firste hath layde 10 francz, that is 200. s. and 4 is 204, the which ye shall multiply by 2 monethes, and they shall bee 408. the multiplicatour of the fyrst. The seconde hath layd 15 franc. for one yeare, and in 15. is bene 300. s. and in one yeare is 12 monethes, therefore multiplye 300 by 12, and there shal bee 3600 the multiplicatour of the second. The third hath layd 6 frances, 7 shillinges, and in 6 frances is 120. s. and 7 bene 127. s. for 8 monethes, therefore multiplye 127 by 8, and they shall be 1016 the multiplicatour of the thyrde. And for to haue the diuisor common, ye must reduce together al the multiplicatours, and that shal be the deuisor common, as ye maye see by the example folowing. They haue 24. frances of winning.

The fyrst hath 2 frances and half 8. s

and

and halfe. 5. pence, and halfe, resteth 1360. pence.

The second shall haue 17. franc. 3. s. and halfe. d. resteth 1952. pence.

The third shal haue 4 franc. & halfe, 7. s. 0. pence, & halfe resteth 7112 pence.

408. 3600. 1016. 5024.

Multiplicatours. Diuisor.

And 1. d. is to deuide of the restes.

For to make the proofe, ye shal reduce together the three summes that they haue had. And if there be more or lesse, the rule is euyl made.

¶ The rule of company of Factours wyth Marchauntes Seruauntes.

Of thys rule of Factours ye maye make. 3. rules in maner of questions that fall among Marchauntes.

Example. 8. Marchauntes, 5. factors, and 3. Seruauntes or Varlets haue made company together, & haue clearely gotten. 50. franc. whereof the Factours

routs ought to haue the halfe of the Marchauntes, & the Seruauntes the third part of the Factours, howe shall they deuide these 150. frances. Answer. For all such rules and questions it behoueth you to finde a number wherein is an halfe and a third, and that shalbe 6, and this 6 shalbe for the Marchant. And the halfe of 6 is 3, that shall be for the factours, and the third part of the factors is one, which shalbe for the seruauntes. And then ye shall multiplye the one by the other, that is to wyt, the personages by their number, 6 tymes 8 is 48, and this 48 shal be the multiplicator of the Marchaunts. And then there is 5 Factours, that haue 3, and 3 times 5 is 15, and then there be 3 Seruauntes that haue 1, and 1 tymes 3 is 3 and therfore the Factours shall ye multiplye by 15, and the Seruauntes by 3. Now for to finde the diuisor common, ye shall set together all the multiplicatours, that is to wyt, 48. 15. 3. whych be

66, these 66 shalbe the diuisor common.
Example, they haue to deuide 150. frāc.
The Marchaunts haue 109. franc. 1. s and halfe. 3. d. and halfe, resteth. 21. d.
The Factours haue 34 frances. 1. s. and halfe 3. d. and halfe, resteth. 21. d.
The Seruauntes haue 6. franc. and halfe 6. s. 4. d. rest 24. pence.

48. 15. 3. 66.
Multiplicatours. Diuisor.

They haue to deuide 1. peny of restes.
For to make the proofe ye shal deuide al the restes by the diuisor cōmon. And then ye shall reduce all together, for to haue 150 frances.

¶ The rule of Factours, to which got the halfe of the gayne and of the principal.

In other rule in maner of a question a Marchaunt hath geuen 50. frances. to his Factour, by suche couenant that he gouerne them for ten yeares. And at

at the ende of the tyme, that is to wyt at the ende of ten yeares they shall deuide the gayne and the principall. It happeneth that the Factour wyll goo hys way at the ende of 6 yeares, and he fyndeth that he hath gayned a thousād fran. I demaund how ought the sayde Factour to bee payde, and how muche ought the sayd Marchant to haue. Answere. He ought to regarde how much he should haue gained in those 10 yeres that hee shoulde haue holden them in gayne as he had promysed. Therefore ye maye lorme the question: if 6. haue gotten a thousand, how much shall bee the gaynes of. 10. Multiply 1000 by 10 and deuide by 6, and ye shal fynde that he should haue gotten 1666. franc. and an halfe. 3. s. 2. pence. Of the whyche gaynes the Marchaunt ought to haue the halfe, that is 833 franc. 6. shillinges and halfe, and. 1 penye. And then take by those 833 fran 6. shyllynges & halfe 1 peny of 1000 frā, that he hath gayned

and there remayneth 166 franc. 13. shyllinges 5 pence for the Factour. Nowe ye may aunswer that the Marchaunt shall haue of the gaynes 833 franc. 6 shillinges, and halfe 18, And the halfe of the principall, that is to wyt of 50, that is 25, and there be 858 frances, 6. S. & halfe 1. D. And the Factour shal haue of gaine 166 franc. 13. S. 5. pence. And of the principal 25, that is 191 frances, 13. S. 5. D. And thus may ye do of all other semblable. And it is proued by the reduction of the two summes gayned.

¶ The third rule of Factours with couenauntes, that the Factour shall gayne the halfe of the principall.

An other rule of companye of Factours & Marchaunts which couenant that the Factours shall gayne the halfe of the principall, and not of the gayne. Example. A Marchaunt geueth vnto hys Factour 400 frances, that he shall

gouerne

gouerue them for 6 yeares, and at the ende of the tyme the halfe of the principall shal bee to the factour. It happeneth the factour wyll go hys waye at the ende of 2 yeares, and hath gayned 200 frances, I demaūd how ought the factour to be paid. Answer. We ought to regard how muche he shoulde haue gayned, if he had serued al his time, and for to finde it ye may worke by the rule of three, for ye must multiplye by hys cōtrary, that is to wyt by 6, and deuide by his semblant, that is by 2, in saying, if 2 haue gayned 200 fran. how muche shal 9 gayne. We shal find that he shuld haue gotten 900 franc. and he gayned but 200 frances. Wherfore he ought to make againe 400 frances to the Marchaunt, and he ought to haue the halfe of the principall, that is 200 frances, therefore he oweth 200 vnto the Marchaunt, and so he hath lost al hys tyme and 200 frances of aduaūtage, for the Marchaunt ought nothing to lose like

as he had accomplished all his tyme.

¶ The thyrd rule of chaunges for to vse decert or fraude.

Two Marchauntes wyll chaunge theyr marchaūdise, and the one be gyled the other, the one hath pepper, & the other clothe. Hee that hath pepper wyll sel for 25 frances the hundreth by chaunge, which is no more worth then 20 frances in syluer contente. Ide maund for how muche ought the other to sell vnto hym the elle of hys clothe, that is worth but 15.s. to kepe hym self from losse. Answer For the rule of thre ye may say thus: if 10 frances of contēt geue me 25 frances at the chaunge how much shal geue me 15 of content. It behoueth you to multiplye the 25 by 15, whych bene 373, the whych ye shall deuide by 20, and thereof commeth 18.s. 9.d. therfore ye may say that he shal sel the elle of clothe for 18. shillinges. 9. d. And thus may ye do of all other.

Two

Twoo Marchauntes wyll chaunge their marchaundise, of whom the one hath 100 pounde of woolle, that is no moze woozth but 15 crownes. And hee wyll chaunge with an other in a peece of cloth that is wozth 21 crownes, and he wil geue hym the woole foz 17 crownes. I demaund foz how muche ought the other to sell the peece of cloth, to the end that he be not detrompeb. Answer By the rule of thzee, when 15 are wozth 17, demaund how much shall be wozth 21. Deuide by 15, and ye shall fynde the same that ye require.

Twoo Marchauntes wyll chaunge their marchaundyse, and the one defraude the other that hath pepper, and wyl sel it foz 24 franc. the hundzeth by chaunge, which is no moze woozth but 20 fz in money content, & he wyll haue the halfe in mony contnt. I demaunde foz howe muche ought the other to sell the elle of hys clothe, whych is no moze wozth but 15 .s. Answer. Ye must take

awaye the money content that the other demaundeth, that is 12 frances for the iust price, & of the which he will sell ouer. Therefore take away and withdraw 12 of 20 frances which is the iust price, and there rest 8 franc. for 8 and 4 is 12. And ye may say by the rule of thre if 8 geue me 12, what shal geue me 15. s which is the iust price of the cloth, multiply 12 by 15 and deuide by 8, and there of cõmeth 22.s.6.d. And therefore the Marchaunt ought to sell the elle of his cloth after 22.s.6.d. els he should haue losse. And thus ye ought to do of al maner of chaunges and barathes, for if he that hath the pepper, demaunded but the thirde or the fourth, or 2 or 3, abate al onely the same that he shall demaund, and then by the rule as is said. And note ye wel, that if ye wyll multiply shillinges, ye shall haue shillinges. And of crownes ye shal haue crownes and of frances ye shall haue frances. And in lyke maner of all other.

¶ Other

Other rules and questions to haue the more knowledge of the science of Arithmeticke, and the first is of collects & talliages.

TEn men owe vnto the king of collect and talliage 244 frances, I demaund how they shall deuide them, to the ende that eche one pay after the valour of his goods, for it is reason that more be payde by the riche, then by the poore. For hee that is more endowed wyth goodes, is more bounden vnto God and to the prince. Answer. It behoueth to know how muche eche one is worth in hys goods and possessions.

The fyrst is worth 100 frances.
The second is worth 400 frances.
The thyrd is worth 154 frances.
The fourth is worth 1000 frances.
The fift is worth 1150. frances.
The syxt is worth 40 frances.
The seuenth is worth 440 frances
The eyght is worth 80 frances.
The nynth is worth 600 frances.
The tenth is worth 300. frances.

Now

Nowe it behoueth you to fynde the multiplicator and the deuisor. The multiplicatour shalbe eche one by hym self, and so for the fyrste it behoueth you to multiply by 100, for the second by 400, for the third by 154, and so ye must doo of all the other. And for to finde the diuisor, ye shall set together all the multiplicatours, as 100. 400. 154. &c. and all that together shall be the diuisor common, which is 4464. Therefore multiply the collect, that is to wyt 244. for eche one his valour, & deuide by 4464 or by the halfe, that is 2232, and then ye shall wryte how muche eche one ought to pay.

¶ Example.

The fyrste should pay 5. franc. 9. shyllinges. 3. d. and halfe, reste. 1464.

The seconde should pay 12. franc. 17. shillinges 3. d. resteth. 1392.

The third should pay 8 frances. 8. s. 4. pence, resteth 660.

The fourth should pay 54 frances, 15 shillinges. 2. d. resteth. 1248.

The

The fift should pay 62 frances. 17. S. 2. pence, resteth 96.

The syxt should paye 2 frances 3. S. & halfe 2. D. and halfe, resteth 1037.

The seuenth should pay 24 frances, 1. S. 0. pence, resteth 192

The eyght should pay 4. frances 7. S. 5. pence, resteth 2064.

The nynth should pay 23 frances. 15. S. 10 pence and halfe, resteth. 2088.

The tenth should pay 27 frances 6. S 7. pence, resteth. 624.

And they haue to deuide 2. pence and halfe of restes.

Then when ye haue al deuided, and writ the summe and the restes, ye shall set together all the restes, and deuide them by the diuisor common, or by the halfe. And if there be more or lesse, the rule is not well made, for the remaynant of all ought to bee deuided by the diuisor common. And the proue of thys rule is reduction. And marke well thys rule, for it is right good vnto the coun-

try

countrey where all the goods be prayled by all the Townes and Castels, as it is in manye places of Daulphine, and of Prouence.

¶ The rule of three mylnes.

One man hath three milnes, of whō one grindeth eche day 5 septiers of corn and the other grindeth 7, and the third 8. There commeth a Marchaunt that wyll haue grounden one hundreth septiers of corne, I demaunde how ought the Mylner to deuide the corne to the mylnes, to the ende that eche one haue alloone done, as an other. Answer. For to know thys questiō and rule, ye must finde the diuisor and the multiplicator. The multiplicator shal bee eche one by hymselfe, & the diuisor shal be the three multiplicators set together, they be 20. Therefore if ye wyl know howe much corne ought to be layde vpon the fyrste mylne, ye must multiplye the 100 septiers of corne by 5, and deuyde by 20. whych shalbe 25 septiers, that shall bee

layd

layde vpon the firſt myne. And for the ſecond ye ſhall multiply 100 by 7, and deuide by 20, and there ſhall be 15 ſeptiers, the whych ye ſhall put vpon the ſecond myne, and for the third ye ſhall multiplye 100 by 8, and deuide by 20, and there ſhalbe 40 ſeptiers, which ye ſhal put vpō the third milne. And thus maye ye doo of all other ſemblable. It may be made otherwyſe, ſet together the ſums that the three milnes grinde, that is 20, and by the rule of three ye ſhal ſay: if 20 geue me an 100 how much ſhal geue me 5 or 7, or 8. And it is proued by Addition.

¶ Example. 100.

The fyrſt ſhal haue 25 ſeptiers. The ſeconde 35 ſeptiers. The thyrde 40 ſeptiers.

7.5.8. Multiplicatours. 20. Diuiſor.

¶ The rule and queſtion of a Shepheard or Paſtour.

Foure

Foure me haue 300 shepe or muttons, of whom the first hath an 100 shepe, the secõd 40. the third 150. and the fourth 10. And they geue vnto a shepherd for to keepe these shepe 25 frances for a yeare. I demaunde howe ought eche one to pay of the 25 frances after the shepe that he hath. And howe long time ought eche one to haue hym at commons or meate. Answer. For to know this rule & al other semblable, it behoueth you to fynde the multiplicator & the deuisor. The multiplicator of the first shalbe 100, of the second 40, of the third 150, & of the fourth 10, and the set together al these sũmes the whiche be 300 the diuisor common. Or ye may make it by the rule of three in saying: if 300 geue me 25, howe muche shal geue me 100 or 40, or 150, or 10, and alwayes deuide by 300, & thus of al other restes.

¶ Example of the first.

100	8	franc.	6.	S. 8.D.
40	3	franc.	6.	S. 8.D.

150 12 franc. 10 s.
10 0 franc. 16 s. 6.d 300
Multiplicatours. Diuisor.

Nowe for to knowe howe long eche one oughte to nourisshe hym, ye muste make the yeare in monethes, and than multiply by the multiplicatours, as is sayd aboue, and deuide by 300. Or to make it more sure and certayne, ye shal set the yeare in dayes, that is 365, and then multiply eche one by hys multiplicatour, and deuide by the diuisor common, that is to wit, by 300, and ye shall finde that the first ought to nourisshe the shepheard 121 daies and a half, & a fyrt part. The second 48 dayes and a halfe and a fyrt part. The thyrde 182. dayes and a halfe. And the fourth 12 dayes, & the fyrt part of a day. And thus maye ye doo of all other rules.

¶ The rule and question of a vessel wyth three fountaynes or wholes.

A vessel

A Vessell holdeth 60 Septiers of wyne, in the which there be three fountaynes or holes, of whom if the leaste runne, it should empty one septier in an houre, the nexte 2 septiers in an houre. the third five in an houre. It happeneth that it rūneth at all the three fountaynes at once. I demaunde in how manye houres the vessell shall be voyde, and howe muche eche one shall voyde by it selfe. Answer. For to know how much eche one shal voyde, it behoveth you to fynde the multiplicatours, therefore deuide 30 by one, and it is 30, which is the multiplicator of the fyrst. For the seconde deuide by 2, and therof commeth 15. And for the thyrde deuide by 5, and that is 6. And than set together all the summes, that is to wyt, 30. 15, and 6, and they be 51. Therefore multiply eche one by him selfe, & deuide by 51.

¶ Example.

30 35 septiers, 1 quart and an halfe,
15 17 septiers, 0 quart and an halfe,

rest

rest 4 and halfe.

6 7 septiers 6 quarte, rest 12. 51.

Multiplicatours. Diuisor.

And for to knowe in howe manye houres this vessel shall voyde, ye shall set together the three nombers, that is to wyt. 1. 2. 5. whiche be 8. and that 8. is the diuisor therfore deuide 60. by 8. and ye shall fynde that in 7. houres and an halfe it shall be empty. And thus maye ye doo of all other semblable.

¶ The rule & question of Zarasins, for to cast them into the sea.

There is a Gallye vpō the sea, wher in bee thirtye Marchauntes, that is to wyt, 15 Christian men, and 15 Zarasins, there falleth great tēpest, wherupon it behoueth them to caste all the marchandise into the sea, and yet for all that they be not in surety from perishyng, for the Gallie is feable & weake, so ẏ by a decree made by the Patrone it

is necessarye that there bee caste into the sea the halfe of the thyrty Marchaũtes; but the Zarasins will not be cast in nor also the Christians: then by an appoyntment made, they shall sette them downe vpon a rowe, & then count them vnto 9, and he that should fall vpon the 9 to be cast into the sea, how woulde ye sette them that none of the Christians shoulde be cast into the sea. A unswere. Ye shall ordayne them after these meeters folowinge.

Fyrst 4 and then 5, and 2 before one,
Then 3 and then 1 standing alone.
One and then 2, then 2 and then 3,
Then 1 and then 2 and 2 wyth 1 bee.
The Christians name fyrst, the Zarasins after
In all these numbers, which stand so in order.

That is to wyt. 4 Christians 5 Zarasins, 2 Christians 1 Zarasin, 3 Christyans 1 Zarasin, 1 Christian 2 Zarasins, 2 Christians 3 Zarasins, 1 Christian 2 Zarasins, 2 Christians 1 Zarasyn.

Or for to knowe it more shortly ye may

woorke

wooꝛke by this verse folowynge, by the number of these vowels.

Now turne the man, sit and take rest,
Be it as then he was.

The rule and qnestion of a Testamente.

A Man hath made his Testament ỹ which hath left his wife greate with childe, & hathe ordayned in hys testament, ỹ if she brought fooꝛth a sonne, he shoulde haue 2 partes of hys goodes, that is to wit. of 1200 crownes & hys wife ỹ other part & if she brought fooꝛth a daughter, thē the mother should haue 2 partes & the daughter the other part. It happeneth when the man is dead, the wyfe bringeth fooꝛth a sonne & a daughter. I demaund how shall they deuide the 1200 crownes. Answere. We shall set 1 fooꝛ the daughter, and 2 fooꝛ the mother, fooꝛ the mother ought to haue 2 partes against the daughter, and set 4 fooꝛ the sonne, fooꝛ he oughte to haue two

partes against the Mother. Therefore ye shal multiplye the 1200 crownes by 4 for the Sonne, by 2 for the Mother, and by 1 for the Daughter. And for to finde the diuisor ye shall sette together 1.2. and. 4. which bene 7, therefore deuide by 7.

Example.

4 The Sonne shall haue 685. crownes and an halfe. 7. s. 8. d and halfe, resteth a halfe. d.

2 The Mother shall haue 342 crownes, & an halfe. 12. s. and halfe 4. d. resteth 2. pence.

1 The Daughter shall haue 171. crownes. 15 s. 5. d. resteth. 1. d.

4. 2. 1. 7.

Multiplicatours. Diuisor.

They haue to deuide an halfe peny.

¶ The rule and question for to build, and first for the place.

A Man hath a grounde that is in length 100 yardes, and in bredth 70 yardes, where as he wyll edifice

fye & build houses of lengthe 5 yardes and 4 of breadthe. I demaunde howe many houses shall he haue vppon that grounde. Aunswer. Ye shall multiplye the length by the breadth in saying 70, tymes 100 bene 7000, and eche houle muſt haue 5 yardes of length, and 4 of breadth, multiply the one by the other, and they make 20, which 20 shal be the deuisor cõmon, therfore deuide 7000 by 20, and ye shall fynde that there shall be 350 houses. Note well this rule.

❧ A rule and question of the walles.

A Man wyll make a wall 32 foote in length, and 2 of thicknes, and the heyght 25 foote, and eche foote shall cost the makyng 2 s. I demaunde how much shall cold the makynge of all the wall. Answer for to knowe thys rule, ye shall multiplye the length by the thickenes in saying: 2 times 32 ben 64 and then ye shall multiply it by heyghte

in saying : 25 tymes 64 is 1600. & then multiply by the price, that is to wyt by 2 shyllynges the whyche bee 3200 shyllynges, whereof ye shall make frances, therefore deuide them by 20, and they be 160 frances. And so muche shall coue the makyng of the wall.

¶ The rule and question of the tylyng of a house.

If you wyll haue a house couered wt tyles, ye must know how many tyles behoueth you to haue vnto ẏ lẽgth of a lygne, and how many to the bredth. Example. If the house had nede of 54 for the lengthe, and 34 for the bredth, I demaunde howe manye shoulde be requisite vnto all the house. Answer. Multiply the lengthe by the bredth in saying 34 tymes 54 ben 1836 tyles, and so many muste ye haue to couer the house.

¶ The rule and question of a garden.

A Louer dyd enter into a Garden for to gather apples for hys ladye and vnto the sayd garden be three gates, and in eche gate is a porter; and when he shall issue after that hee hathe gathered the apples he muste geue the halfe of hys apples and one to the fyrst porter, and when hee is at the seconde porter, he must geue vnto him the halfe & one, and to the thyrde porter the halfe and one, and when he is forth hee hathe no more but one apple to geue vnto his Ladye paramoure. I demaunde howe many apples had he gathered. Answer He had one apple when he was forth, set to it one, and then it is 2, then double the 2 and it is 4, therefore he had 4. at the thyrd porter. Then to thys 4 set 1. and that is 5. and then double them and it is 10, therefore he had 10 apples at the second porter, to thys 10 set 1 and it is 11, double them and they be 22 apples. Therfore ye may saye that he had gathered 22 apples.

¶ The fule and question of a ladder or stayre.

I haue seene a stayre that had 100 steppes, in the fyrst steppe was 1 douffe, in the seconde steppe 2, in the thyrd 3, in the fourth 4, and so vnto 100. I was demaunded howe manye douffes were in all the stayres, I aunswered 5050. Probation, I wyll geue you certayne of all number that do procede naturallye, that is to wyt, 1 2 3 4. 5 6 7 8 9 10. And infinitelye as ye wyll, for all number naturally is ended in nūber euen, or in number not euen, if it be ended in number euen, than by the halfe thereof multiply the number not euen, that encloseth it. ¶ Example. 1 2 3 4. wyll ye know what all amounteth vnto in saying: 2 tymes 5 is 10, for 2 is the halfe of 4, and 5 is the number not euen that encloseth 4. And if the number ende in number not euen, as by example, 1 2 3 4 5. Wyll ye knowe what all amounteth vnto. Multiplye 5 by hys greater halfe, that is 3, saying: 3

times

times is 15. And thus shall ye alwayes do in what number soeuer it bee euen or not euen.

¶ The rule and question of two men.

If two men go by one waye, and that they goo into any far place, and procede in suche wyse, that the one procedeth eche daye certayne number of myles, that is to saye 4 and 5 more or lesse. And that other man goeth encreasing the first daye one myle, the second daye 2. the third daye 3. and so encreasing after progression. Be ye all certayne that in some daye the one ouertaketh the other. It is demaunded in what day, and howe many myles they shall go. Answer. Double the number of his myles that goeth eche daye an egal number of myles. And of the number double, take awaye one vnite, & the remnant shall shew you what day they shall meete eyther other.

¶ Ex-

¶ Example. We shall set it that the one goeth a day 6 myles, double that & it is 12, and fro that 12 withdrawe one vnite, as it is sayde in the rule, and ther remaineth 11. that is the number of the day that they shall meete together. And for to knowe the number of the myles that they haue gone. Multiply 11 by 6, in sayinge: 6 tymes 11 is 66 myles that they haue gone. Thus maye ye knowe it by the rule of progression continued, 11 is a number not euen, he it therefore multiplied by the greater halfe, that is to woyt by 6, in sayinge: 11 tymes 6 is 6. tymes 11 is 66. And also one onely number amount by Progression, & by multiplication, whereby it appeareth that vpon the eleuenth daye they meete eche other, and haue gone 66. myles.

¶ The rule & question of the women that bare apples to the Market.

THree women bare apples wel and honestlye trymmed to the Market of whom the one bare 50, the other 30, and the thyrd 10, theyr housbands were brethren and gaue commaundement to theym that they shoulde makē as good market one as an other, that they sel al after one pryce, and that the one brynge as muche money home as the other. I demaunde howe that maye bee doene. Aunswere. It is possible. For fyrste there commeth a Marchaunte to her that hath 50 apples, and saythe to her howe manye for one peny, and she aunswered 7, and so she maketh 7. d. of her 50 apples, and hath remayning one apple. The other soulde after the same price. And she that had 30 apples soulde hers for 4. d. and she had remayning 3. apples. The other that had 10 apples, solde hers for 4. d. and shee had remayning 2 appels. And thē came there another marchaunte that gaue 3. d. for an apple. And so eche one bare home 10. d.

as ye

as ye see in thys example. And thus may ye do of all other semblable.

¶ A Rule and question of the bagge.

A Marchaunt hath a bagge that weyghyth 19 ounces of thre metailes, whereof 7 ounces is of gold 8 of syluer, and 4 of copper. And he will take thereout 5 ounces. I demaunde how much of gold, how much of siluer, and how much of copper is in these 5 ounces. Answere. Ye shal multiply the 5 for to know the gold by 7, for the siluer by 8, and for the copper by 4. And for to finde the diuisor, ye shall set all the multiplicators together, that is 19, therfore deuide by 19. The aunswere is in this example.

Of gold 1 ounce and an half. 8 d 5 grayne, resteth 1 peny.

Of siluer 2 ounces, 2 d & halfe. 1 halfe grayne, resteth 2 pence

Of copper 1 ounce, 1 peny 6 grai-

nes,

nes, resteth .6.

Now set the remanant together and deuide it by the diuisor common, that is 19. And it is one halfe grayne.

¶ The rule and question of the bell.

IN a church is made a bel, & therein is put 30 pound of golde, 50. li. of siluer, 100 of tynne, and 102 of copper. Whan the bel is made there remayneth 40 pounde in one peece, that they wyl sel, I demaund how much is there of gold, how much of syluer, how much of tyn, and how much of copper. Answer. Ye shal do as is aboue sayde of the bag, for ye shal multiply 40 eche one by hymselfe, and deuide by 282.

¶ Example.

30 Of gold 4. peund 4. ounces 4. d 1 grayne, resteth 6.

5 Of siluer 7 pound 1 ounce 11 pence 9 graines & an halfe, resteth. 57

100 Of tynne 14 pound 2 ounces and halfe

halfe 10.d. and halfe, 7 graines
resteth 114. pence.

Of copper 14 pound 7 ounces 11.
pence and an halfe 5 graynes &
halfe, resteth 105.

Multiplicators. 182 Diuisor cõmon.

And all deuided they haue of restes
1 grayne.

Thys rule is proued by Reduction,
set to the same that remayneth, and de
uide by the diuisor common, and there-
of commeth 1 grayne.

¶ The rule and question to chaunge golde into syluer.

A Marchaunt hath 100 franc. in
golde, & he goeth vnto a chaun-
ger & sayth: I haue 100 frãc in
peeces of golde, I would haue the mo-
ney thereof in small peeces, that is to
wyt of 2 d. of 3. d. of 4. d of 5. pence, of
6 pence, of 8. peme, and of 10 pence. and
I would haue as manye peeces of one
as of an other. I demaunde howe ma-
nye

ye peeces of euerye money oughte the chaunger to geue hym. Aunswere. We muste set together all theise numbers, 2. 3. 4. 5. 6. 8 and 10 that is 32 the diuisor common, and then ye muste make of the frauez pence, that is 24000. d. whyche ye shall deuide by 32, and there bee 750. peeces of ech money, and thus ye maye do of al other semblable.

¶ The rule and question of cloth of diuers coulours.

I Haue a peece of cloth whereof the thyrd part is whyte, ỹ fourth part blacke, and 8 elles of graye. I demaũd how much hath it of length Aunswer. Set 12, for in 12 ye shall fynde one third and one fourth, the third and the fourthe of 12 is 7, and there remayneth 5, therefore forme the rule of three. if 5 be comen of 12 of howe muche shall come 58 multiplye 12 by 8, that is 96. and deuide by 5, and thereof commeth 19 elles and 1 fyfte, therefore ye maye

answer

answer that the peece of clothe hath of length 19 elles and one fift.

¶ The rule and question of spiceries.

A Bourgesse sayde vnto hys Seruaunt: hold these 13 frances, and go and bye the pepper that costeth 15.s. the pound, and suger that costeth 18.s. the pounde, and of fyne spyces that costeth 9.s. the pounde, & gynger that costeth 13.s. the pound, and cloues that costeth 10.s. the pounde, and bryng me as many poundes of one, as of an other. I demaunde howe manye poundes ought the Apoticarye to geue hym for 13. francz. Answer. We shall set all the prices together. 15. 18. 9. 13. and 10 which be in number 65, which shall bee the diuisor, and then ye shall make the francz in shillings, that is 260 shillings And then ye shal deuide by 65, and there cōmeth 4 pounde. therfore ye may answer that he ought to geue hym 4 pound

pounde, therefore ye may answer, that he ought to geue him 4 pounds of all these spiceries.

The rule and question of the Egges.

A Younge mayden beareth egges to the market for to sell, and she meeteth a yong man that would play with her, in so much that hee ouerthroweth & breaketh the egges euerye one, and wil not pay for the. The mayde causeth him to be called before the Judge. The Judge condempneth hym to paye for the egges. but the Judge knoweth not howe many egges there were. And that hee demaundeth of the mayde, she answereth that shee is but younge, & can not wel counte, but she and her mother had ordayned & disposed them by 2 & 2 and there remayned 1 egge. Then by 3 and 3 & there remayned 1, then by 4 and 4 and there remayned 1, then by 5 and 5 and there remayned 1, then by 6 and 6 &

there remained 1, and at the last by 7. & 7 & there remained none. I demaunde how many egges there were. Answere. 721. And for to proue it multiplye the numbers one by another in sayinge: 2. tymes 3 is 6, 4 tymes 6 is 24. 5 tymes 24 is 120, 6 tymes 120 is 720, and sette thereto 1 that remained alwayes, & then they bee 721, that which ye shall deuide by 7, and there remayned nothinge, and so he had 721 egges. And after thys example maye the Judge iudge the yonge man to paye.

¶ The rule and question of money forgotten with a Chaunger.

AN aduocate hath geuen to a Chaunger money, & hathe forgotten howe much. For to know how much, and for to haue all his money, he findeth subtilty & ensueth, he saith to one of hys sonnes (of whom he hathe manye) go vnto such a Chaunger & bringe me a trance, and the tenth parte of the money that I deliuered him, and so it was doone.

And

And at another tyme he sayd vnto another sonne, go vnto the Chaunger, and bryng me 2 frances, & the tenth parte of the remaynant, & so he sayd vnto al, but vnto the last he sayd: go vnto the Chaunger, and bringe me all the remaynant of the money, and so was it done, and as much brought the one as the other. I demaund how much money hee hadde, how many sonnes, & how much mony eche one of them brought. Answer, For these three questions pose the number, that they all brought, that is to wit, the tenth be 10, and of 10 take one, and ther do remaine 9, therfore ye may saye that he had 9 sonnes, & eche one broughte 9. fr. And for to knowe how much he had geuen to the Chaunger ye muste multiply 9 by him selfe, and it is 81. Therfore he had deliuered 81 franc. to the Chaunger. For to make the proofe lay 81, and take vp for the first sonne 1 & the tenthe part of the remaynant, and in lyke maner ye must do of all other.

of tyme. &c.

A Man sayth: if I had as muche more of tyme as I haue, & the halfe, the thirde & the fourthe of my tyme that I haue set to, I should haue of yeares 50 I demaūd what age he hath. Answer. Lay 12, for in 12 ye find an halfe, a thirde & a fourth. And then sette there once as much, & that is 24, then set thereto one halfe, 1 thirde, & fourth of 12, & they bee 37, & then forme thy question. If 37 be comen of 12, of how muche shal come 50 Multiply 12 by 50, and deuide by 37, & ye shall finde that he hath 16 yeares 78 dayes and a halfe 10 houres resteth 2.

¶ The rule and question for to deuide distributions.

IN a Churche be 12. Channons, 9 Priestes & 6 Clarkes, they haue to deuide a distribution of 400. francz, whereof the Channōs haue 3, the Priestes 2, & the Clarkes 1. I demaund how much shall the Chanōs haue, how

much the Prieſtes, and how muche the Clarkes. Anſwere. Multiplye one number by an other in ſaying: 3 tymes 12 is 36, that is the multiplicatour for the Chanons, 2 times 6 is 18 the multiplicatour for the Prieſtes, 1 tyme 6 is 6 the multiplicatour for the Clarkes. How muche eche one oughte to haue, ye maye ſee in the example by the diuiſor. Set together all the multiplicatours, and they be 60, the diuiſor common.

36	240	frances.
18	120	frances.
6	40	frances.
Multiplicatours.	Diuiſor.	60

The rule and queſtion of the ſpeire.

A Speyre is the halfe and the thyrde part within the water, & 9 foote without. I demaund how muche of lengthe hath the ſpeyre. Anſwer. Set 6, for in 6 is found a halfe and a third, the halfe and the third of 6 is 5, and there remay-

neth 1 forme the rule of three: If 1 be comen of 6, how many shall com of 9. multiply 6 by 9. and they be 54, deuide thē by 1 and they be 54, therfore ye maye answer that that speire hath 54 foote of length, the halfe is 27. & the thyrd is 18. & there be 45 foote within the water, & 9 without, that is 54. And so maye ye do of all other semblable, as of a toure.

¶ The rule & question of twoe men that went the one agaynste the other.

Two menne begin to go & take theyr iourney the one againste the other vpon one daye and in one houre. For that one that goeth from Paris to Lyons, goeth euerye daye 7 myles, that other goeth fro Lyons to Paris, and goeth eche daye 9 myles, and from Lyons vnto Paris bene 80 myles. I demaūde how long tyme shall it be or they meete Answere. Set together the myles that they go in one day, that is to wyt 7 & 9,

which

whiche is 16. Forme nowe the rule: if 16 come of 1 daye, of how much shall come 80 that they haue to go, multiplye 80 by 1, and it is 80, the which ye maye deuide by 16, and thereof commeth 5, therfore in 5 dayes they meete. The proofe is, for he that goeth from Paris to Lyons goeth in 5 dayes 35 myles, and the other 45, which be in al 80 myles.

¶ The rule and question of a Cat.

There is a Cat at the foote of a tree the length of 300 foote, this Cat goeth vpward eche daye 17 foote, & descendeth at nyght 12 foote. I demaunde in how long tyme shall she be at the top Answer. Take vp and abate the nighte of the day, that is 12 of 17, & there remayneth 5, therefore the Cat mounteth eche day 5 foote, deuide now 300 by 5 & thereof commeth 60 dayes, then shee shall be at the toppe. And thus ye maye doo

of all other semblable. For of thys rule ye maye make 4 questions, as it appeareth in the practise thereof.

¶ The rule and question of twenty Scollers.

If 20. Scollers owe vnto their Hoste 3.d. tourneys, howe ought they to pay, so that eche one paye hys duty, and geue the money of his puts. How much shall eche one paye. Answer. Eche one shall paye 1. penye Parts, and the Hoste shall returne vnto him agayne 1 penye tourneys, and so eche one shall paye the 4 part of a turneys.

¶ The rule and question of Pylgrymes.

Twenty Pilgrimes, that is to wyt, menne, women, and lyttle chyldren, haue spent in drinke 20 pence, where of the men paye 3.d. the women 2.d. & the litle chyldren halfe pence. I demaunde how many men, & howe manye women, and howe manye chyldren be there for to pay thys 20.d. so that there bee 20. per-

sons

lons. Answer. There shal be one man, 5 women, and 14. children.

¶ The rule and question of a Chaunter.

A Chaunter hath eche daye of rent fro the Courte of the Pryncs 12. s. the which is payed by knightes, Damoseis and Squyres, of whom the knightes pay 2 s. the Damoseis 6 pence, and the Squiers 3 d. I demaund howe manye knightes, howe manye Damoseis, and how many Esquires ought there to bee to paye thys 12. s. so that there ie persons. Answere. There must be 5 knightes, 1 Damosell, and 6 Esquiers.

¶ The rule and question for to deuine.

If ye wyll cause your fellowe to beeleue that he shall deuine howe many peeces of Syluer he hath in hys ryghte hand, saye vnto him that he put as manye peeces in that one hande as in that other, & then that he take 5 from the left hand to the righte hande, & that he put

tooyth of the ryght hande into the leafte hand as many peeces as he hath remayning in the lefte hande. And there shall remayne 10 in the right hand.

¶ The rule and question of three Saintes.

A Hermit is entred wiñ a Churche wherein there be 3 Saintes, that is to wit: S. Peter, S. Paule, and Saincte Fraunces. This Hermite cōmeth fyrste to S. Peter & sayth to hym in a maner of his oyasiō: I praye thee that it please thee to double the syluer peeces that I haue in my purs, and I shall geue thee 6, and so it was don. Then came hee to S. Paule and sayd to hym please it the to double the peeces that I haue in my purs, and I shall geue thee 6, and so was it don. Then came hee to Sayncte Fraunces and sayde: if it would please the to double me the peces that I haue in my purs, I shall geue thee 6, and so was it don, and nothing had he remayning. I demaund howe many peces of fyl-

uer had he in his purs. Answere: he had 5 & 1 fourth. And for to knowe it double them, & they be 10 and an halfe, & then ye muste geue 6 to S. Peter, and there remayneth 4 & an halfe, double them and they be 9, and then geueth hee 6 to S. Paule, and then there remayneth 3. double them, and they be 6, and that 6. geueth he to S. Fraunces, & so he hath nothing remayning.

¶ Here folowyth diuers other proper rules and questions

A Lord hyred a seruaut, the whiche he shoulde geue euerye yeare 10 nobles and a gowne, & the same seruant dwelleth 7 monethes wyth hym, and then they varye, in so muche that hys Lorde gaue hym lycence to go his waye. And sayde: go thy wayes out of my house & take thy gowne wyth thee and then I am nothing in thy dette. Nowe I demaund what was the gowne worth: wyll ye know it: the marke how many monethes 7 is lesse then a yeare, it is 5

monethes lese. And had the seruaunt tarried so long yet by his maister, thē shuld he haue had the gowne and 10 nobles. Therfore say thus: 5 monethes geueth 10 nobles, what geueth 7. make it after ỳ rule of three, & it cōmeth to 14 nobles.

¶ Of three felowes or yong men.

Three felowes play together the one to wyn the others money. For the one had more money then the other. And ỳ first casteth that the one of them 2 leeseth iust to muche money as the other 2 had. Then casteth the second and leseth also as much as the other 2 had. Then casteth the third and leeseth also iust as much as the other 2 had. And then was the money iust deuided, & had eche lyke much. Now I demaunde howe muche had eche or they began to playe, & howe muche money that eche had when they played. Wil ye knowe that, then marke how many persons dyd playe, & adde 1 to them, as here adde 1 to 3 maketh 4. so many nobles had ỳ first. Nowe dou-

ble

ble 4 cõmeth 8, & subtra 1 from 8 reste 7 so many nobles had the seconde. Then double 7 commeth 14 thereof subtra 1. reste 13, so manye nobles had the thyrd.

¶ An other question.

A man byeth 46. li. of saffron for 30. pound, what shall coste 63. li. of saffron. Wil ye know that, thẽ multiplye the 30. poundes with the 63. li of saffron, commeth to 1860. Nowe deuide them wyth 46 cõmeth 41. li. and $\frac{4}{46}$ parte of a poũd to pay for the 63. li. of saffron. Now wyl ye know how many shyllinges that $\frac{4}{46}$ part of a li. is, then multiplye 4 by 20, for 20. s. maketh a. li. cõmeth 80. s. deuide them with 46 cõmeth 1. s & $\frac{34}{64}$ part of a. s. Now wil ye knowe how many pence that $\frac{34}{64}$ parte of a shyllynge is, thẽ multiplye 34 with 12 pence, maketh a. s. commeth 408. Deuide them wyth 46 commeth to 8 pence, and $\frac{40}{46}$ part of a peny. Now wyll ye knowe how many farthinges that $\frac{40}{46}$ parte

of a peny is, then multiply 40 wyth 4, for 4 farthinges make a peny, cõmeth 160 farthinges. Now deuide them with 49 commeth 5 farthings and $\frac{22}{46}$ part of a farthyng.

This done ye shall finde that 36 li. of salt peter cost 41 li. 1. s. 8. farthynges and $\frac{22}{46}$ part of a farthyng.

Item a 165 poundes of alome coste 2. poundes, 5 shyllinges 6 pence 9 farthinges: what shall coste 22 poundes of alome. If ye wyll soyle thys question, then make of your poundes shyllinges, and adde thereto the odde 5 shillynges, cõmeth to 45. s. Then make of the 45. s pence, and adde 6 pence, cõmeth to 546. d. then make of youre pence farthinges and adde thereto the 9 odde farthinges cõmeth to 2193 farthinges. Nowe multiply the farthinges with 22, commeth to 48246 farthynges. Nowe deuide them wt 165. commeth to 292 & $\frac{66}{165}$ parte of a farthyng, for so manye farthynges

shall cost 22.li.of alome. Nowe wyll ye knowe howe manye pence that the forewritten farthinges make, then deuide them wyth 4, for 4 farthinges make a peny. Then wyll ye know howe manye shyllinges that they make, then deuide the pence wyth 12, for 12 pence maketh a shylling. Thus done ye shal finde that 22.li.of alome coste 6.s.3.d.1.farthinge, and it is done.

¶ An other question.

A Marchaunt hath boughte a bag of pepper, I saye not how heauy, but whē he geueth for a pounde of pepper .12.d then remaineth hym yet 37 pence. And when that he geueth for a pound of pepper.15.d.then he lacketh 44.d.to paye for the pepper. Now I demaunde how heauy the bag of pepper was & howe much money ỳ the Marchaũt had. For to know thys & suche other lyke question, ye shall take and subtract 12 from 15. & there resteth 3. which 3 shall be youre deuisor. Then shall ye adde 44 and 37.

toge-

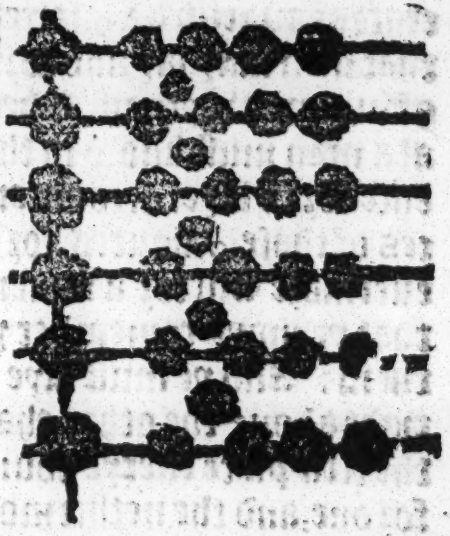
together, & that maketh 81. Then muſt ye deuide 81 with 2, & therof cõmeth 27 ſo many pounde waieth the bag of pepper. Now wyll ye know how much money the Marchaunte had, then muſt ye multiply 12 ẅ 27, & adde 37 thereto, or multiplye 15 ẅ 27, & ſubtra 44 cõmeth 301, ſo many pence had the Marchaunt.

¶ An other queſtion.

A dronkard drinketh a barrell of bire in the ſpace of 14 dayes, and when hys wife drinketh with him, thẽ they drinke it outs wythin 10 dayes. Nowe I demaunde in what ſpace that hys wyfe ſhould drinke that barrell of biere alone For to ſoyle this queſtion & ſuche other lyke, ye ſhall firſt ſubtra the leaſte drinker frome the more, that is 10 from 14, and there remayneth 4, & that is youre deniſor. Now ſaye: 4 geueth 10, what geueth 14. make it after the goldẽ rule, and ye ſhall finde that ſhee ſhoulde drinke it in 35 dayes

¶ Here endeth the introduction of Algoriſme for the pen.

Here begyn-
neth the Introduction for to learne to recken with the counters, with diuers rules belonging to the same.



FOr as much as there be many persons that bee vnlearned, and cannot wryte, yet nenertheles the craft or science of awgrym & reckoninge is nedefull

ful for them to know, wherefore I shal hereafter declare & write of this science in the best & shortest wise that maye be possible, howe that ye shall order your selfe in reckoning and to cast counters.

First ye shall understande that in the craft of augrim be .9. letters or figures that men may lay and write all maner of summes wythall. Therefore fyrst of al a man must know in this craft or science for to laye .9. counters in the places of these .9. figures, for they must lye euermore still for a remembraunce, so that ye maye remember your place by them. And ye must laye them the one right aboue the other, that is to say, in the first place euerye counter standeth for one, and the nethermost counter is the first place. In the second place euery counter standeth for 10. In the third place for a .100. In the fourth place for a thousande. In the fyfte place for ten thousande. In the sixte place for a .100. thousande. In the seuenth place for a million.

myllion. In the eight place for 10. mylli-
lions. In the ninth place for a hundreth
millions. In the tenth place for a thou
sand millions, and so forth infinitelye.
And note wel that euery counter that
is layd betwene the lynes, betokeneth
euermore 5 tymes more then the coun-
ter that lyeth in the place nexte vnder
him, that is to say the first counter ly-
ing alone aboue the first place betoke-
neth 5 the counter lieng alone betwene
the second and the third lyer and place,
standeth for 50, aboue the third place 5.
hundreth, aboue the fourth 5 thousand
aboue the fift place 50 thousand, aboue
the sixt place 500 thousand, aboue the
seuenth 5 millions, aboue the eyght 50.
millions, aboue the. 9. place 500 mylli-
ons, aboue the tenth place 5000. mylli-
ons. But if ye wil ỹ more suter kno we
your places, it is neceſarye for you to
marke euery place with a marke, as to
lay a counter or som other thing which
shall lye styll, & in no wyse be remoued.

but ye muſt take heede if ye laye counters for the marke of your places, that ye lay them not nye the counter that ye muſt worke withall, leaſte that ye take the one for the other, but laye them as ye ſee them marked in the examples folowing. And when ye haue layde markes, & knowe the order of youre places, ye maye adde & ſubtrah, multiply, and deuide what numbers ye liſt, that is to ſay, to caſt & to abate at your pleaſure.

Item when there lye 2 counters betweene two lyers, take hym vp and lay 1 beſyde the next lier aboue them. And when there lye 5 counters beſyde anye lyer, take them vp and lay 1 in the nexte ſpace aboue them.

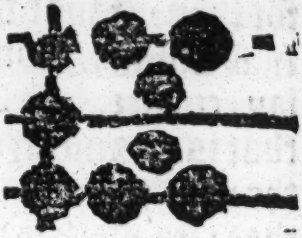
¶ Of Addition.

Addition is none other thinge but to ſette together 2 or 3 numbers, & to make of them a totall ſum, as in the example folowing.

There is a man whiche oweth 20.li. 18 peund

18 pound, 100. pound. 50. pound, and 69. pounde. Nowe if ye will knowe howe much that al these summes maketh to gether. Then for the first sum ye muste lay 2 counters beside the seconde lyer, for they 2 stande for 20, that is for the fyrst summe. Nowe for the second sum lay 1 counter beside the second lyer, for that is 10, and laye 1 counter betwyxte the neathermost & the seconde lyer, for that 1 standeth for 5 and then laye three counters beside the neathermost lyer, and they altogether make 18. Now for the third sum ye shall laye one counter beside the third lyer, for that is an 100. For the fourth summe laye 1 counter beside the thyrd and the second lyer, that is 50. Now for the fyft summe lay one counter betwixt the thirde and the second, and 1 beside the second lyer, and 1 betwene the seconde and the neathermost, and 4 beside the neathermoste lyer, and that maketh together 69, and in so doynge ye shall fynde that all the

forewrytten summes make together 247. as ye shal see in the figure folowing. And euermore for a general rule remember your places, for euerye counter that lyeth beside the first lyer. Standeth but for .1. in the seconde place euerye counter standeth for 10, in the third place for 100, as is before rehearsed.

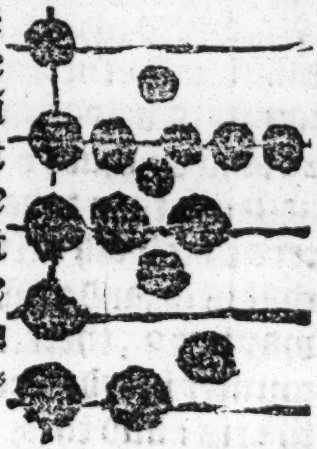


Wyll ye proove whether ye haue added well or not, than subtragh al your sũmes one after an other. And in likewise as ye do with this example, so ye shal do with all other of addition.

¶ Of Subtraction.

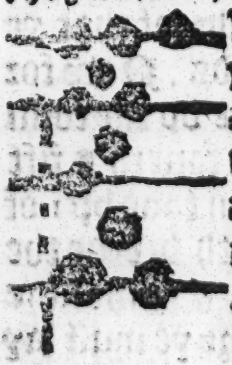
Subtraction is, if ye wyll withdraw anye sum from an other sum, ye must know 2 numbers, that is to wit, the number that ye wyl withdraw, and the number wherefro ye wil withdraw. An example. There is a man that owyth you 9756 pounds and

and thereof hee hath payde you .5986. pounds. Nowe if ye wil knowe what there resteth, then set downe your sum that he ought you, & therof withdraw the sum that he hath paied you, and that that remayneth, is the sum that he doth yet owe you, as ye more playnlye maye see in the example hereafter following.



And when ye haue set your debt, that is to say. 9756. pounds vnder this maner, as before is shewed. Then if ye will know the rest, then take therof that ye haue payde as 5989 pounds. Now for to do this, ye shal first take vp the counter that lieth betwene the fourth & fift lier, for that is 5000. Then take vp 1 of the counters whyche lyeth beside the fourth lyer, & that is 1000. & ye shoulde take awai but 900. therfore ye must lay

down 1 counter againe beside the third lyer, that is 100. Then take vp one of the counters that lyeth beside the third lyer, which is 100, from which ye should take but 80, therfore ye muste laye two counters beside the second lyer, that is 20, and 80 that ye haue taken vp maketh 100, then take vp one of the counters that lyeth beside the seconde lyer, that is 10, and ye shoulde haue taken away but 9, therefore ye muste laye one counter beside the neathermoste lyer, that is 1, and the 9 that ye haue subtrahed or taken vp, maketh 105 and there remayneth 3767. pounds dette, and they stand thus.



Will you proue whether ye haue subtrahed well or not, then adde thereto that ye haue payed, and if the summe come then so greate as it was afore, then is your subtraction true, els not.

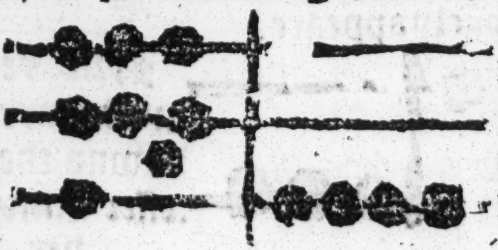
¶ Of Multiplication.

Multiplication is nothing els but to multiplye one number by an other, as thus, to knowe what is 6 tymes 9, or 6 tymes 12 and suche lyke. And in multiplication ye muste consider two numbers, that is to wyt the number that ye wil multiplye, and the number whereby ye wil multiply, and ye must woorke in multiplication after thys manner. Fyrste ye shall laye downe the lesser number, whiche is. 6. and this 6. is the number, that shall bee multiplied, & the 9 is the number that ye shall multiplye withall. And ye shall laye the number that shall be multiplied at the ryghte syde of your lyers, and when ye woorke your multiplication, ye shall laye them at the lefte syde, as in this example hereafter folowinge shall moore playnely appeare.

Fyrst ye muste laye downe the lesser number

ber, which is 4, as in this example ye see them layd here on the right hand of the liers. And when that ye haue thus done, ye must take vp one counter, and lay 9 for it on the other syde of the markes, that is to wytte at the leaft syde. And after that take vp an other counter, and laye also 9. for it, and so forth for euerye counter that yee take vp ye must lay 9. for it at the other syde. And when that yee haue so wrought your worke, it will come iust to 36, as ye see the counters before layde on the leaft hand of the lynes.

And if ye wil multiplye by greater numbers, as thus, to knowe what is 24 times 14. First laye 14 on the right hand of your lyers or markers, as thys example following sheweth.



And then set youre fynger against the secõd lier,

and

and that finger so set, doth dampne all the places vnderneath as though that were the first place, & then take vp the counter ẏ lyeth in the place where your finger is, & now recken ẏ seconde place to be your first place, & then laye 24 on the leaft hand of your matke, as the example sheweth. After that done take away your finger, & then take vp 1 of the 4 counters, & for him lay 24 on ẏ lefte syde, as ye dyd before, & so for euery coũter that ye so take vp lay 24, & it shall come to 336. as the exãple before sheweth, and then ye haue the effect of your question, that in 24 tymes 14 makes iust 336. Furthermore if there happen anye counter lye betweue the places, as 5, or 50. or 500. or such other, then ye must take heede howe ye recken in the multiplyinge, as thus: if ye wouide knowe what is 8 tymes 16. firste laye 8 on the ryght hand of your lyers, as ye dyd before, then set youre fynger at the counter that lyeth alone aboue the

first

fyrste place whiche was layde for 5, & then recken that place to be the first place, and then recken the space that is betwene the seconde place, and the third place to be your second place, so that ye must recken hym 10 from the place where your finger is, but this ye must specially take heede of, that ye recken the place next aboue your finger to double the place where your finger is. For if ye take heede ye shall euidentlye see it by reason, for 2 tymes 5 maketh 10, & 10 times 5 maketh 50. Thē to procede in your question, ye muste worke it after this maner: take vp your counter at your finger, and lay for it on the right side of your markes 16, after that maner laye a counter in the space nexte aboure your finger, and recken hym for 10, and then laye 3 counters in the place next aboue your finger, & recken euery-

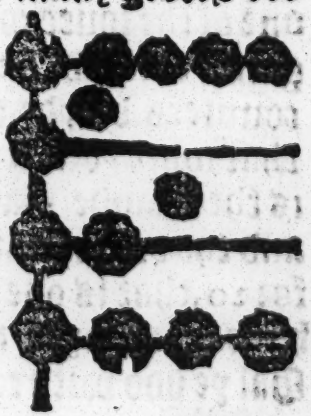
chone

chone of them for 2. which maketh iuſt 6 then 10 and 6 maketh iuſt 16, as the figure before ſhewed. When ye haue ſo done, then take awaye your fynger, and for euerye one of the 3 counters that lieth in the fyrſt place on the ryght ſyde, laye 16 on the leaſt ſyde, and then take them of the ryght ſyde awaye, & ye ſhal ſee that the number ſhall come iuſt to 128 as the example before ſhewed. And this wyſe ye muſt recken all counters that lyeth in the ſpaces, if the multiplication ſhall be truly made.

¶ Another example.

For to knowe howe many grotes bee in 4563 nobles.

Fyrſte ye ſhall ſet downe the leſſe nũber, that is the number that ye ſhall multiplye, as thys fygure followynge plainlye here ſheweth.



Now

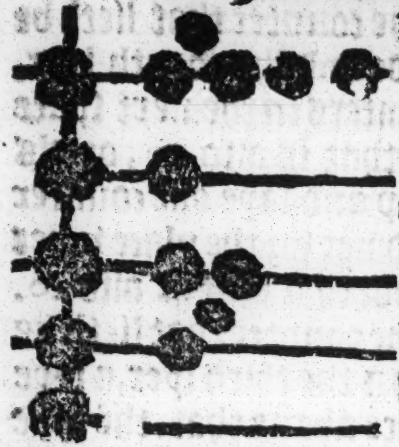
Nowe for to make of these nobles grotes, ye must multiply them with 20 for 20. grotes maketh a noble. Nowe for to multiply this number euermore, ye must lay downe the number that yē wyl multiplye at the right side of your markes, and set your finger agaynste the marke that ye begin at, for your finger shalbe a remembraunce to you, for that place where your finger standeth, is the firste place, and dammeth all the places vnderneath him.

Nowe for to make grotes of these 4563. nobles: First ye shal set your finger against the fourth lyer, and take vp one of the foure counters that lyeth against the said fourth lier, and lay two counters beside the nexte lyer, aboue that wher your finger stādeth, for that is the seconde place from your finger, and the two counters so laid, standeth for 20, that is one noble, and like as ye haue done wyth thys one counter, so shal ye doo with the other 3. following.

Then

Then take vp the counter that lieth be tweene the thirde and the fourth lyer, and lay two counters in the next space aboue that, and that is also 20, or els ye may take it vp and laye one counter beside the second lier for the place wher your finger standeth, & that is also 20. Then take vp the counter that lieth be twixt the second & the third lyer, & laye 2 in the next space aboue that. thē take vp the counter that lyeth beside the second lyer, and lay 2 counters beside the next lyer aboue that same. Then sette your fynger agaynst the fyrst lyer, and take vp one of the 3. counters, and laye 2. counters for it beside the next lyer aboue that, & as ye haue don with that, so must ye doo with the 2, and then ye shall fynde that. 4563. nobles maketh 91290 grotes, and standeth thus, as the example hereafter sheweth. And as ye haue done wyth these forewritten examples of multiplication, so shal ye do with al other of multiplication.

Wyl



Wyll ye knowe or proue whyther you haue multiplied wel or not, then deuide ỳ grotes, that is .91260. by .20. & if the summe come to ſtãde as it was before, then haue ye multiplied well. And thus alwaye ye maye make your proofe vpon all manner of multiplicatours.

¶ Of Diuiſion.

Diuiſion is to deuide a ſumme thorowe an other ſumme, and in this diuiſion muſte bee knowen two numbers, that is the number that ye will deuide, and the number whereby ye will deuide it, as to knowe how many tymes ye may haue a ſmall number out of a great, as by exampl.

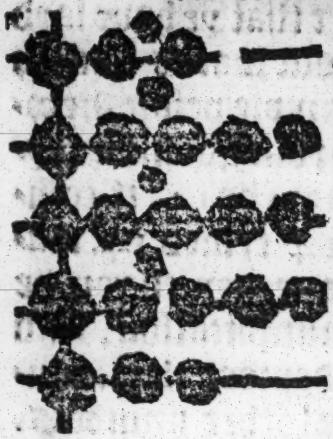
If ye wyl deuyde .336. by .14. as in this
ensample hereafter. First laye .336. on
the ryght hand of your lyers, and then
set your finger at the hiest place where
any counter lieth, for as I shewed you
before that damneth all the other pla-
ces beneath, so that then there as your
fynger is, is the firste place. And then
looke if ye may take 14 from that place
which ye cannot do, for euerye counter
standeth but for one, because your fyn-
ger is there, therefore ye must remoue
your finger to the nexte place beneath
wher the other 3 counters lie, and then
looke if ye may take 14 from that place
which ye may doo right well, for these
3 counters at your fynger standeth but
for 3, and the other 3. counters aboue
standeth for 10. and then se how many
tymes 14 ye may haue out of 33. and so
many counters ye must laye on the o-
ther side iust against your fynger, that
is to saye, ye maye haue 28. out of .33.
that is two times 14 out of 33 and ther

fore ye muſt take vp 28, and lay .2. counters on the other ſyde agaynſt your finger, and the ye can haue 14 no more, the ye muſte remoue your fynger to the

nexte place beneath, and then recken that place at your finger to be the firſt place, as ye did before, and then looke how many times 14 ye may haue from that place which ye cānot, for that coũter at your finger ſtandeth but for one, and the other in the ſpace aboue ſtandeth but for ten, whych is in all but. 11. therefore ye muſt remoue your fynger to the nert place beneath, and then ye ſhall ſee that that number is 56, out of the which ye mai wel take out 4 times 14, which maketh iuſt 56, therefore ye muſt take vp 56, and lay 4 counters on the other ſide agaynſt your finger, and then take awai your finger, and ye ſhal

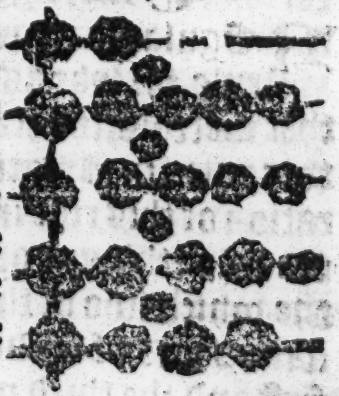
ſe

see that that number that ye haue layd on the leaft side of your marks cōmeth iust to 24, as the example before shewed, and then ye haue your question soyled. For if ye deuide 336 by 14, it commeth iust to 24, for 24 tymes 14. maketh iust 336, as I haue shewed you before in the rule of multiplication. And likewise as ye haue deuided this number, ye may do with al other numbers. And if ye will prooue whether ye haue well deuided or not, take the number that cōmeth of your diuision, and multiply it with the small number, that is your diuisor, & ad that remayneth therto if ther be any, & then it wil come iust to the great number, that was the nūber to be deuided. And lykewyse if ye wil proue whither ye haue truly multiplied or no, take the great number that commeth of your multiplicatiō, and deuide him by the number that is to bee multiplied, and it will come iust to the third nūber that was your multiplier.



If you desire to know howe manye grotes be in 79662. pence. Firste ye shal set down your pēce as ye see in thys figure here, & ye shall deuide them wyth 4, for 4.d. maketh a grote. Nowe to the operation thereof, when that ye haue set downe your pence, as the figure aboue sheweth, then set your finger at the hiest counter, & see if ye maye haue 4. from that place, which ye cannot, for there lyeth but one, and it standeth but for one, because your fynger standeth there, therefore ye shal remoue your finger, and set it agaynst the fyft lyer, and see if ye may take awaye 4, the whych ye may do, for there lieth 7. Now your finger standeth agaynste the fyfte lyer. therefore ye shall take vp the counter that lyeth in the next space aboue your finger,

finger, for that counter is 5, & ye should take vp but 4, therefore ye shall take it vp and lay it beside the fyft lyer of the right syde, and lay one on the leaft side also beside the fift lyer, then see if you can haue 4 any more from that place, the which ye cannot, therefore remoue your finger, & set it agaynst the fourth lyer, and then see how many tymes 4. ye may haue out of 36, ye may haue 9. times 4, and for this 9 times 4 ye shal laye one counter in the space betwene the fourth and fyft lyers, and 4 beside the fourthe lyer, and that maketh. 9. And as you haue done with these, so shal ye doo with al other followyng, & when ye haue fynished your worke, you shall fynde the 7999 l. pence make 10998 grotes, as ye may se plainly here in thys figure.



Certayne rules.

¶ The proofe.

If ye wyl proue whether ye haue deuided well or not, then multiplye the grotes with 4, for 4.d. maketh a grot, and if the sum come to stande as it dyd before, then ye haue deuided wel.

Item when ye deuide any sum with pence, if there remayneth anye thing it is pence. And if ye deuide by shillings, if there remayneth any thing it is shyllings. And as ye haue done wyth these forewritten examples, so maye ye doo with all other.

¶ The golden rule.

Regula aurea is called the golden rule, for lyke as gold passeth all other mettals, so this rule passeth all other rules in Awgrim. And to the operation of this rule must alwayes be noted three thinges or three numbers, of the which two of them must be lyke of names and of kinde, that is to wit the first and the third number, & alwayes ye

ye shall multiplye the seconde nnmber with the third, & that that commeth of the multiplication is the number to be deuided by the fyrst number, that is generall diuisor, and the quotient of the diuisor sheweth a number of solucion of name and kinde of the middle numbers, as in these examples followynge shall appeare.

If a man byeth .40. egges for .20.d. how many for 12.pence? If ye wyl solue this question, ye must multiplye the second and the thirde number together, and the product or the summe that commeth of that multiplication, ye shall deuide by the fyrste number, lyke as here is shewed in this example. When ye bie .xl. egges for .20. pence, what shal one pay for 12 eggs? Ye shall multiply 20 with 12, commeth to 240, the which ye shal deuide with 40, commeth to. 6. pence, and so much shall ye paye for the 12. egges. And thus ye may do with all other such questions.

¶ An other question.

Item a 100 appels cost 12 pence, what shal one pay for 87: He shal multiplye 12 with 87, commeth 1044, the which ye shal deuide with a 100, commeth 10. pence $\frac{44}{100}$ part of a d. for the 87. appels.

Wyll ye know howe many farthinges that the 44 hundreth part of a peny is worth, thē multiply 44 with as many farthinges as a peny is worth, that is 4. cōmeth 176, the which ye shal deuide with a 100 commeth 1. farthing, and $\frac{67}{100}$ part of a farthing.

Item 165 pound of ware cost 2. li. 5. s 6. d. 9. mites, what shall cost 22. li. For to soyle thys question and suche other lyke: Firste ye muste make of poundes shillinges, and adde thereto the odde 5. s. the which stand in this question, and they come together to 45. s. then make of the shillinges pence, and adde thereto the odde 6 pence that standeth in the question, commeth to. 540. d. thē make

of the pence mites, and 24 mites is a peny, and therto adde the odde 9. mites that stãdeth in the question, commeth together to 1313. mytes, and that is the total summe of all the poundes, shyllinges, pence, & mites together. Nowe make it after the rule & say: 165 pounde of waxe cost 1313 mites, what shall cost 22. pound. First multiplye the myddlemost and the last together, that is: ye shal multiply the mites wyth the last, ỹ is with 22, & it shal come to 288489. deuide them with 165, and it shal come to 1748 mites, and $\frac{69}{165}$ part of a myte, so many mytes shall the 22. pounde of waxe cost. Now wil ye know how manye pence that the forewrytten mytes make, then deuide them wyth 24, for 24 mites maketh 1 peny. Then wyl ye know howe manye shillinges that the pence make, then deuide them with 12, for 12. d. maketh a. s. And thus doyng ye shal finde that the 22 pound of waxe

shall

shal cost 6 shyllinges, 20 mytes and $\frac{66}{165}$ part of 1 myte, and it is done.

Item when ther stādeth 1 in the first place. As 1 goose cost 3.d. what shal cost 28. ye shall multiply the middlemost wt the last, in saying: 3 times 28 is 84, so many pēce cost 28 geese, & it is finished.

Item in the contrary, as when that 1 cōmeth in ye latter end, as here in thys example 20 capons cost 23 pence, what shal cost 1 capon. For to soyle this question ye shal deuide the myddlemost wt the first, ye is 23 with 20 cōmeth 1 d. & $\frac{3}{10}$ part of a peny, that is 10 mytes, & $\frac{4}{5}$ part of 1 mite for 1 capon. $\frac{1}{3}$

Item 17 els & $\left|\frac{1}{2}\right|$ cost. xiiii. nobles & 3 part of a noble, what shall cost. 32. els & $\left|\frac{2}{4}\right|$ part For to soyle this question and such lyke, first ye must breake the fyrst and last broken together crosse wise in saying: 1 times four is 4, set the 4 by 17 elles. Then say: 3 times 2 is 6, set the 6 by the 32 elles. Then multiply booth the numbers of your fractiōs together

gether, in saying four tymes 2 is 8, the which ye shal set vnder 4 and 6, then it standeth thus, as in the rule of three, if 17 els and | 4/8 | part of an elle cost. xiiii. nobles, | 8 | and | 1 | parte of a noble, what shall cost 32. | 5 | els, & | 6 | part of an elle. First multiplye the | 8 | first hol number with the neathermost of hys broken, that is 17 with 8 cõmeth 136, & therto ye shal adde the 4 that standeth aboue 8 cõmeth 140, the which ye shall multiplye with the 3 that standeth vnder the second brokẽ, cõmeth 420, that is your deuisor, then multiply 14 wyth the 3 that standeth vnder 1, & adde that therto, cõmeth 43, that is your multiplicatour, then multiplye 32. with the neathermost figure of his broken, that is with 8, and adde thereto the same 6, that stãdeth aboue the same 8, cõmeth 262. Now set it in the rule of thre in saying: 420 els cost 43 nobles, what shal cost 262, multiply the secõd w the third, and then deuide that y cõmeth of that mul-

multiplication with the fyrste, and ye shall finde that the 32. elles of cloth cost 26 nobles, 16. d. 34. mites, and 30/420 part of a myte.

Item when that ther standeth at the beginning a whole number with a broken, and in the second and thirde place no broken, as here: 36 elles, and 1/2 cost 8. li. what shal cost 16. els.

For to soyle this question, ye must multiply the first whole number wyth the vndermost figure of hys broken, that is 36 with 2, and adde the 1. therto that standeth aboue 2. commyng 73, & that is your diuisor then multiply 8. li also with the vndermost figure of the broken, that is to wit with 2, & it commeth to 16, then multiplye 16 with 16. cõmeth 250, the which ye shal deuide with 37. & it will shew you that ther shal be to pay for the forsayde cloth 3 pound, 10. shillinges, one peny, 17 mytes, and 33/73 part of a mite.

Item when ther standeth in the first

or

or in the second no broken number, but in the latter end a whole number with a broke, as here 14 ounces of grain cost 14.s. what for 9. ounces of grayne and one thirde. For to knowe thys ye shall multiplye the first 14 wyth 3 that standeth vnder the broken, commeth to 42 that is your diuisor, then multiplye. 9. wyth 3, and adde that one thereto that standeth aboue 3, commeth to 28, then set it thus 42 geueth 14, what geueth 28. Make it forth after the rule, and ye shall finde that there is to paye. 9. shyllings 4 pence for the 9 ounces of grain and one third part.

Item when that ye finde neyther at the beginning nor at the latter ende no broken number, but in the myddest a whole wyth a broken as here. A man bought 48 sheepe for 64 crownes, & 2 what shall one paye for 18. sheepe. 4

For to soyle this question ye must multiply 48 with 4, which commeth to 192 that is your diuisor, then multiplye 64

wyth

wyth 4, and adde thereto the two that standeth aboue 4, commeth to 258, the which ye shal multiply with 18, cõmeth to 4644, ẏ which ye shal deuide with 182. And thus ye shal finde that ye must pay for the 18 shepe 24 crownes, 4 stiuers, and 36 mites Brabans.

Item whẽ ye finde no broken at the beginning, but in the second and third one whole with a broken. As 7 els for 6 pound $\frac{1}{4}$ what shal cost 16 els, and $\frac{1}{5}$

For to soyle this question ye must multiply the two vndermost broken numbers together, in saying: 3 tymes 4 is 12, the which ye shal multiplye wyth 7, cõmeth to 84. that is the diuisor. Then multiply eche with his broken, cõmeth 25 & 49 the which ye shal multiply one with the other, cõmeth 1225, the whych ye shall deuide wyth 84, & the solution shalbe to pay 14. li. 12. s. 18. d.

When that ye finde at the beginning & the middest a whole with a broken, &

at the latter end standing a hole wyth-
out a broken, and 9. elles and $\frac{3}{4}$ for 5. li.
$\frac{5}{8}$ what shall cost 15 elles? Multiply. 9.
wyth 4. & adde therto 3, cõmeth 59, the
which ye shall multiply with. 8. cõmeth
312, that is your diuisor, then multiply
5 with 8, & adde thereto the 5 that stan-
deth aboue 8, cõmeth 45, the whych ye
shal multiply with 4 that standeth vn
der the first broken, cõmeth 180. Nowe
set it in the rule of three, in saying: 312
geueth 180, what geueth 15, make it af-
ter the rule, and it cõmeth to 8. li. 13. s.
22. mites, and $\frac{19}{57}$ of a mite.

¶ The rule of company.

There be 3. Marchauntes or compa-
nions, the which lay together their mo
ney in marchaundise, euery to win after
his inlaying. The first layd in 170 crow
nes, the secõd 60 crownes, the third 40
crownes and with it they haue won 50
crownes & al costes. Aske how muche

that

that eche shal haue after hys inlaying. Now for to soyle this questiou and all suche other rules of companye, ye must make of their money that they haue layd in a total summe commeth to 250, nowe say 250. geueth 50, what geueth 150, make it after the rule of three, and it commeth to the first mã 30. crownes winning. Now for to know what the second hath wonne, ye shall say: 250 geueth 50, what geueth 60, make it after the rule, and ye shall finde that the second hath wonne 12 crownes. Wyll ye know what the third hath, then sai 250 geueth 50, what geueth 40, make it after the rule, and ye shall finde that the third hath won 8. crownes. And thus shal ye do with al other rules of cõpany

¶ The rule of company wyth tyme.

THree fellowes put marchaundyse together, whereof the fyrste layeth in 50. crownes for 4. monethes. The

second

secõd 80 crownes for 2 monethes. The third 100 crownes for 5 monethes, and withall this money they haue wonne 6 crownes beside their costes payd. Now I demaunde what eche hath wonne with his monye. For to knowe thys, ye must multiplye eche mans monye with his tyme, that is for the fyrst 50 with 4 cõmeth 200, set that as though he hath layde in so muche, for the secõde multiplye 80 with 2 commeth 160, sette that also as though he had layd in so muche. Now adde the 3 numbers together, & then make it after the rule of company, and then shall ye finde what eche hathe wonne with his companye.

¶ The rule of batering.

Two marchaunt men wyll chaunge their wares together, and the one hath a fine blacke cloth the which is 43 elles long, and he will geue the elle no lesse then 18 pence. The other Marchaunte hath pepper, and he will sell the pounde no lesse then 13. d. Nowe I demaunde

howe many pounde of pepper the fyrste marchaunt shall haue for hys 43 els of cloth. For to soyle this question ye shall say. 13 geueth 43, what geueth 18, make it after the rule of 3, & ye shall finde that the fyrst shall haue for his cloth 59 poūd of pepper 8, ounces 12, englishe and 4/12 part of an englishe.

¶ Of a Watte.

A Wat runneth in the fielde & ouerrunneth in one minute (there bee 60 in an houre) 12, roddes of grounde. And a Grayhound being her enemy, foloweth her, and ouerrunneth in one minute 15, roddes of grounde. But or the Grayhounde began to runne, the Hare hadde run 200, roddes of lande. Now is to be demaunded in howe manye minutes & howe manye roddes of lande was the Hare taken. For to soyle this question and such lyke, ye shall substragh the lesse running out of the moze, that is 12, out of 15, and there remayneth 3 and therewyth ye shall deuide the space that the

Hare

Hare hath run before the Grayehound began to run, that is 20 roddes. And in so doing ye shall finde that the Grayhounde ouertoke the Hare in the 66 minutes, and $\frac{2}{3}$ partes of a minute, that is one houre and 6 minutes, and $\frac{2}{3}$ of a minute. Wyll ye knowe howe manye roddes that the Grayehounde dyd run or that he tooke the Hare, then multiply 66 and $\frac{2}{3}$ with 15, commeth to $\frac{3000}{3}$ the which ye shall deuide with 3 cometh 1000 whole, so manye roddes dyd the hound run, or that he tooke the Hare.

¶ The rule of 2. fellowes.

TWo fellowes wente together oute of a towne, and the one goeth euery day 12 myles, & the other gooeth the first day but one myle, & the second day 2 myles, the third daye 3 myles, and so forth euery day one myle more. Nowe I demaunde in howe manye dayes, & how many myles went he or that hee

ouertooke his fellowe. For to soyle thys question, ye shall double the myles of hym that went euerye daye lyke muche. that is 12, and 2 tymes 12 is 24, thereof ye shall subtrah the one myle that the other goeth the fyrste daye, and there resteth 23, vppon the same daye was the fyrst man ouertaken of hys companion Will ye knowe in how many myle, then multiply 23 with 12 commeth 276, for so many miles wēt he or he ourtooke him

Item there is a fellowe gone out of London towarde Salisburye, and he goeth euerye daye 8 myles, and another fellowe commeth from Salisburye towarde London, and goeth euerye daye but 6 myle. Now I demaunde in howe many dayes shal they two meete. Now for to soyle this question and suche other lyke: First ye muste adde together the number of the myles that they goe both in one daye, that is 8 & 6 maketh 14, therewith deuide the lengthe from the one towne to the other, that is 60

myles,

myles, and in this dooing ye shall finde that they go 4. dayes and $\frac{4}{4}$ parte of a day or they meete.

A Lord had hyred a workeman, the which he gaue euery day when that he wroughte 5 grotes, and when that hee playeth he spendeth euery day 4 grotes and when that it came to the ende of a 100 dayes, the Lorde and the workeman reckoned together, for the workeman had yet receiued no money of the Lorde, and when they hadde reckoned they came iust oute, for the workeman had spent as muche as hee had wonne. Now I demaunde howe manye dayes went he playing, and how many dates dyd he worke in that 100 dayes. For to soyle this question, ye muste adde together bothe the summes of money, that is 5 grotes and 4 grotes, commeth to 9 grotes, that is your deuisor. Now for to know how many dayes that hee had wroughte, saye thus: 9 geueth me foure, what geueth mee 100, make it after the

rule of three, & ye shall finde that he had wrought 44, dayes and 4/9 of a daye

Now will ye knowe howe many dayes that hee playeth, then saye 9 geueth 5, what geueth 100, make it after the rule & it cõmeth 55 dayes and 4/9 of a daye.

¶ Of a man that lay in hys death bed.

Item a man that laye in hys death bed called his children to him and sayde vnto his eldeste sonne, go to the chaunger, where my money standeth, and tell hym that hee geue you money 1 pounde and of that ỹ remayneth yet the tenthe part. Thẽ he saith to hys seconde sonne go to the chaungers as your brother did and tell hym that he geue you 2 pounde & of that that remaineth yet the tenthe part. And to the other he sayd that they should do as theyr brothers had doone, but euer the one should bring a pounde more then the other. And hee sayde to the

the yongest that he shoulde go and fetch all the money that hys brothers hath left there. And when this was don eche childe broughte lyke muche moneye home. Nowe I demaunde howe many children were there, and howe muche money that eche chyld brought from the chaunger, and howe much money was at the chaungers. Wyll ye knowe thys, then subtrah the the teller that standeth in the broken number that is 1 from 10 reste 9, for so manye children hadde the same man. And so manye poundes starlyng dyd euerye childe fetche frome the chaunger. Now will ye knowe howe muche moneye that there was at the chaungers, then multiply 9 with 9 commeth 81 so manye poundes starlynge was at the chaungers.

¶ A goldsmyth hath a peece of 15 ounces, and in the same peece is 6 ounces of golde 5 ounces of sylver and 4 ounces of copper. To thys goldsmyth commeth a man or a woman for whiche wyll

haue made of this peece a kettell of 9 ounces. Now I demaunde how muche gold and syluer and copper shall bee in this kettell. If ye wil soyle thys question, then saye: 15 geueth 9, what geueth 6 ounces, make it after the rule of three and it commeth 3 ounces of golde and 2/5 part of an ounce. Will ye knowe how much siluer, then saye: 15 geueth 9 what geueth 5 ounces, make it after the rule and it commeth to 3 ounces of syluer. Now will ye knowe how much copper, then saye 15 ounces geueth 9, what geueth 4, make it after the rule and it cõmeth 2 ounces 3/5 part of an ounce, & it is done.

A man hath a golden crowne of 34 stiuers, and a Phillippes guilden of 25. stiuers, and a ducate of 28 stiuers, and with this money he goeth to the chaunger, and wyll haue for it negenmanneking crownes of 6 mites. Nowe I demaunde how much that he shall receiue of eche for the foresaid gold, and receiue

of eche lyke much. For to soyle this question and such lyke, then make of all the great mony that he will chaūge mytes, for that is the least coyne that hee wyll haue, and commeth to 9072 mites, then looke howe manye mites that all the small pence be worth that he will haue that is 25. Nowe deuide the greate sum of the mites, that is to wyt 9072 wyth 25, and ye shall finde that he must haue of eche 362, and $\frac{22}{25}$ and it is done.

¶ Of 4 Carpenters.

Foure carpenters will make a house whereof the firste taketh vppon hym to make it him selfe alone in a yeare. The second will make it in two yeares. The third will make it in 3 yeares. And the fourth in 4 yeares. Now I demaunde if al these 4 wroughte vpon that house, in what space would they 4 make that house. Will ye knowe that then say. the fyrst woulde make it in one yeare, that were 12 tymes in 12 yeare. The seconde

in 2 yeare, that were 6 tymes in 12 yere. The third in three yeare, that were 4 tymes in 12 yeare. And the fourthe in foure yeare that were three tymes in 12 yeare. Nowe summe them all together, that is 12. 6. 4. 3. commeth to 25, therewith diuide 12 commeth $\frac{12}{25}$ part of a yere

Now if ye wyll knowe how many dayes that it is, then multiplye 12 with 365 for so many dayes be in a yeare, and that that commeth of that multiplication deuide it by 25 commeth to 17 daies and $\frac{5}{25}$ parte of a daye.

¶ The rule of false positions by the which all manner of difficult and hard questions may easely be dissolued & first of one false position.

NOw shall ye knowe how by false positions or coniectures one or twoo ye shall fynde out the verye truthe of that the whiche ye seeke for, and fyrste ye shall vnderstande howe

to

to fynde the truthe of a question pro-
poled by one coniecture or polycyon.
When that anye question is put foorthe
vnto you to bee alloyled, of the whiche
one parte is knowen and the other vn-
knowen. Anſwere to that queſtion by
and by, wyth your ſelfe at all auenture
and then conſider with your ſelfe whe-
ther ye haue made ryghte aunſwere or
no yf not, looke what proportion is be-
twene your coniecture and that that fo-
loweth of your cõiecture, & the ſame pro
portion is betwene the thing knowen
and that pertaineth vnto the ſelfe thing
being yet vnknowen. As by example ye
ſhall more playnly perceaue.

¶ A certaine wayfaryng man com-
minge by the way found ſo many crow-
nes that the ſeconde, the thyrde, and
the fourth part of them added together
made 50. I demaund what ſumme hee
founde. To make anſwere to this que-
ſtion by one polytion, ymagyne ſome
ſumme that hath theſe partes in it, yis

ſo

to say, a seconde, a thyrde, and a fourthe part, and be it 12, whose second parte or halfe is 6, the third parte 4, the fourthe part 3, which all added together 6. 4. 3. make 13, but the summe that he founde, the seconde, thirde, and the fourthe of it made 50, wherefore 12 is not the sum he found, therefore this position is false and yet by thys false shall ye come to the lyghte of truthe, by the helpe of the rule of three. For looke what proporcyon is betwene the second, the thyrd and the fourthe parte of 12 added together the whiche maketh 13, and 12 whole partes there bee, the same proporcion is betwene 50, whiche is the second, the thirde and the fourth parte added together of the number vnknowen, and the same vnknowen number it self: Then say thus with thy selfe: if 13 whiche containeth the foresayde partes in them come of 12. of whom come 50. then setts them thus: 13. 12. 50. then by the rule of three multiplye 50 by 12, and thereof com-

commeth 600. deuide the same by the firste number 13. and in the quotiente, thou shalt fynde 46 2/13 the whyche was the summe of the crownes the whyche the man founde: of the whyche summe the halfe part is 23 1/13 the thyrd parte is 15 1/13 the fourthe parte 11 7/13 the which partes added together make iuste 50. Thus thou seest howe that by one false posicion or coniecture wyth the helpe of the rule of three, thys question is soone dissolued.

¶ Another question. 2/3

Finde a number in the whiche 5 is that is to saye, two third partes of hym Answer. Imagine any number ye lyste that hath thirdes in it as bee it 6, then looke what is the thyrd parte of 6, that is 2, then two of this thirde partes of 6 maketh 4, wherefore thys posicion is false, yet by this false posicion wyth the helpe of the rule of three, thou shalte

finde

fynde out the truth, after thys manner. If 4 be the $\frac{2}{3}$ partes of 6, to whom is $5\frac{2}{3}$ partes, searche by the rule of three, and thou shalt finde it $7\frac{1}{3}$

¶ Another question.

What number is that in the whiche after that the thyrd the fourthe and the fifte parte bee deducted oute of it, there shall yet remayne 24? Answere. Imagine any number that hath a thyrde, a fourth, & a fifte in hym. As for example, say it is 60, then subtraghe oute of hym hys thyrd, his fourth, and hys fifte part, and thou shalt finde remaine but 13. Lo how muche thou haste myssed, thou shouldest haue founde suche a number in the whiche after the forsayde partes were subtraghed but 13, yet proue by the rule of three, & thou shalte finde the true number. If 13 remayne after the subtraction of the forsayde partes in 60,

what

what number is that out of the whyche after lyke subtraction of thys thyrde, fourth, and fift parte shall remayne 24, proue by the rule and thou shalt finde it 110 $\frac{10}{13}$ whose thyrd part is 36 $\frac{12}{13}$ ỹ fourth 27 $\frac{9}{13}$ is the fift 22 $\frac{2}{13}$ whiche all added together make 86 $\frac{10}{13}$ the whiche deducted out of 110 $\frac{10}{13}$ shall remaine 24. These and diuers other questions before rehearsed by the same craft one false position maye soone be alloyled. Now wyll I shewe you how to dissolue all maner of questions, howe difficult so euer they be by two false positions: For by one false position ye shall not aunswer to all maner of questions, but two false positions, what so euer question it bee, it maye soone haue solucion.

How to aunswere by two false positions.

Innumerable questions doe chaunce in numbers, the which thoughe they can

cannot be dissolued by one position or coniecture, yet shall it not mysse but bee assoiled by two positions: in the whiche maner ye muste diligentlye note howe farre aboue the truth or vnder bothe positions do fall. For by the obseruation of two coniectures howe neare they bee to the truthe, and the difference of the errours whiche ensue of the positions, the veritie commeth to lyghte, whyche may be done 2 wayes. one waye by the rule of both more or bothe lesse. Another waye by the rule of the one more and the other lesse.

When both position bee more then the verity or bothe lesse, then subducte the lesse errour out of the more errour, and that that remaineth shall bee the diuisor, then multiply the firste errour by the seconde position, and the latter errour by the first position, and thē these two numbers beeinge multiplyed, deduck the lesse out of the more, and that that remayneth deuide it by the foresayd

layd diuisor, & the quotient shall shewe the verity. Example.

Thre Marchauntes deuided a. 100. crownes more then the fyrste, and the third 4. mo then the second: I demaud now how many crownes eche of them receaued. Answer. Fyrste make layne Andrewes crosse, as ye see hereafter, then coniecture what ye lyst, as for example: Say the fyrst had 33, and then muste the second haue 36, and the third Marchaunt 40, whych sum gathered together maketh 109, but ye hadde but 100 to deuide, wherefore ye haue mysled, and your position redoundeth to more then the very summe by 9, which came of your first position 33, wherfore set the fyrste posicion. 33. at the vpper end of the crosse on the left syde of the crosse, and by errour which hath ensued of that at the foote of the crosse on the same side, as ye see in the example A. for because that thys coniecture, came to more then the truth, therfore set this

letter M. in the space betwene the vpper end of the crosse & the neather. And for as much as in this first cõiecture ye haue erred thus muche, coniect agayne & suppose that the first marchaunt had 31, then must the seconde haue 34, the thirde 38, all these collect make 103, so that now ye haue erred againe, your position being to muche, so that your errour is 3, & for because that this second position is more then the verity as the first was, set the positiõ 31 at the vpper end of the crosse on the right side, & the errour 3 at the foote of the crosse on the same side, & put this letter M. betwen the space to signifie more. Both these positions then be more then the verity wherfore according to the rule, first subduct the lesse errour 3 at the foote of the right side of the crosse from the greater errour, at the foote of the left side of the same crosse remaineth 6. to be set in the space betwene both the feete as ye see which shalbe ỹ diuisor. Thẽ accordig to

the rule, multiply ẏ first posicion which is 33 by the errour of the seconde posicion which is 3, and therof commeth 99, then the seconde position 31 by the errour 9 of the first posicion, and thereof commeth 279, then deduct the les sum 99 out of thys more sum 279, remayneth 180, deuide this summe by the difference of the errours which is 6, and the quotient shall bee 30, which is the true posicion. For the fyrst man hauing 50, the second must haue 33, & the thirde 37, which all set together make iust 100 Thus wonderfull craftelye by these .2. false posicions the true and iust posiciō is brought to light.

¶ The example.

¶ An example when both positions come to lesse then the verity.

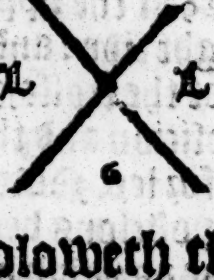
When both positions come to lesse then the veritye, the which is all one matter with the other, as ye shall perceaue by the same example agayne. As suppose ye had conjected that the fyrst had receaued 27, then must the second receaue 30, & the third 34, which added together make 91, which is lesse by 9 then the sum 100, which should be deuided among them. Set then thys first false position 27 at the vpper ende of the crosse on the left syde, and the errour ensuing of that, at the foote of the same crosse on the same syde. And because that this positiō came to lesse thē the verity, therfore set this letter L. for lesse, in the space betwene the position and the errour, as ye see in the example followyng. Then conject agayne, and suppose that the fyrst Marchaunt had receaued 29, then by that reconyng the second shoulde receaue 32, the thyrd 36, which

which al set together make 97, so that yet thys posicion cõmeth not to the verity 100, but lacketh 3 of it, wherfore set this posicion 29 at the vpper end of the crosse at the right side: and this errour 3 at the foote of the crosse, a in the space betwen the posicion and the errour set thys letter L. for les. Now for so much as both these posicions be les then the veritye, worke as ye did before, according to the rule, subduce the lesse error 3 out of the greater errour 9, remayneth 6 for the deuisor to bee set in the space betwene the two errours. Then multiply the first position 27 by the seconde errour 3 commeth 81, then the seconde conjecture 29 by the first errour 9, commeth 261, then deduct 81 out of 261, remayneth 180, whych deuided by 6 the deuisor aforesayd, the quotient shall be 30, which is the iust and very coniecture the which ye should haue coiected. Thus ye haue had sufficient example of thys first rule of both more, and both lesse.

There

¶ Here after foloweth the example of both lesse.

81	180	261
27		29
30	L	32
34		36
6	6	3



¶ Here foloweth the rule of one more, and the lesse.

When the one posicion amounteth to more theu the verity, and the other lesse then the verity, then adde the errours together, and that added number shalbe the diuisor. Then multiplye the first posicion by the seconde errour, and the seconde posicion by the first errour, & that that commeth of both these multiplicatours adde them together also, then deuide this added number by the added errours the diuisor aforesaid and the quotient sheweth the true posicion. ¶ The example.

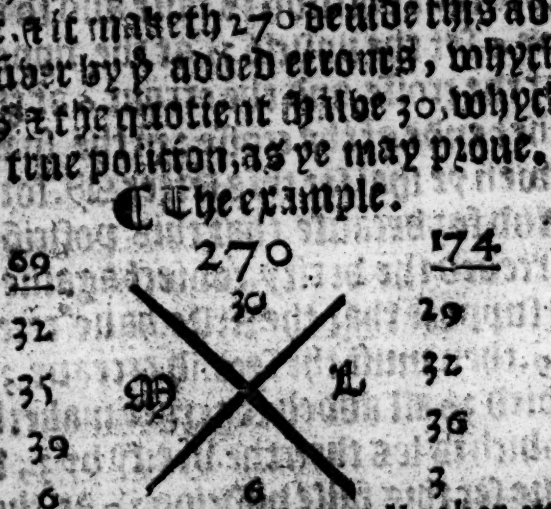
¶ We

¶ We wyl take the fyrſt caſe again, & ſuppoſe that the fyrſt marchaunt haue receaued 33 crownes, then muſt the ſecond receaue 35, and the third 39, wherfore that poſition is falſe and to muche by 6. ſet the poſitiō 32 at the vpper ende of the croſſe, and the errour 6 at the neather ende of the croſſe: in the ſpace betwen ye ſhal ſet this letter M. for more And for becauſe that this poſitiō hath erceded the verity, coniect againe leſſe, & ſuppoſe that the firſte haue receaued 29, then muſt the ſecond receaue 32, the third 36 all added together maketh 97, which is les then the verity by 3, wherfore ſet this falſe poſition 29 at the vpper ende of the right ſyde of the croſſe, and the errour 3 at the neather foote of the croſſe: in the ſpace betweene ſet thys letter L. for les. Of theſe 2 falſe poſitions the one is more then the truth, the other is leſſe, wherfore according to the rule ad both the errours 6 and 3 together, that maketh 9 for the diuiſor: then

multiply the first position 32 by the second errour 3 whych maketh 96, and the second position 29 by the first errour 6, which maketh 174, & that that ensueth of both these multiplications ad it together, & it maketh 270 deuide this added nūber by ẏ added errours, whych was 9, & the quotient shalbe 30, whych is the true position, as ye may proue.

¶ The example.

69	270	174
32	30	29
35	M L	32
39		36
6	6	3



¶ Thus may ye dissolue all other maner of questions, which haue ben set before in this booke, without great paine or study.

Finis.

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